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The THERAPEUTIC GAZETTE

INCORPORATING

MEDICINE AND THE MEDICAL AGE

A Monthly Journal of Practical Therapeutics

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Whole Series, Vol. XLIII. | DETROIT, MICH., MARCH 15, 1919. | Third Series. Vol. XXXV, No. 3.

ORIGINAL COMMUNICATIONS.

BLOOD CONSERVATION IN TONSILLECTOMY—WHY AND HOW.

BY CHARLES P. GRAYSON, M.D.,

Professor of Diseases of the Nose and Throat in the University of Pennsylvania, Philadelphia.

Even the most vehement advocates of the physiological importance of the faucial tonsils will scarcely venture to deny that a vast amount of good has been accomplished by the removal of such of these glands as have been at once both pathologic and pathogenic. And, moreover, if they have kept in touch with the progress of surgical achievement in the tonsillar field, they will probably also be constrained to admit that tonsillectomy has now been brought to a point of such technical perfection that the elements of chance and hazard have been almost entirely eliminated.

On the other hand, there need be no hesitation on the part of the surgeon in admitting that the operation has not yet been standardized, that as yet there is no unanimous agreement among the many operators that the painstaking dissection of the tonsil and its capsule from the adjacent and subjacent tissues is the one and only method of performing tonsillectomy that can be regarded as infallible. The day of dallying with modified tonsillotomes, superficial encircling incisions followed by the holding forceps and snare, or, in brief, with the attempt to do always with one or two instruments what may at times require several, has not yet passed, but it is nearing its close.

If standardization implies an operation that is capable of giving 100 per cent of total removals in every possible type of tonsil, it seems perfectly obvious that there is but one method that can stand this acid test, and that is—thorough dissection. It is this method that is destined to outlive all the others and that in competent hands is as free from risk or uncertainty as anything of a surgical nature can well be. And yet, in spite of this fact, there undoubtedly still exists a large class of people who, clinging to the prejudices and fears that were engendered and fostered by that mere apology for an operation—tonsillotomy—still fail to seek for themselves or their unfortunate children the relief that a tonsillectomy is capable of giving them.

It may be worth while to indulge in a moment's speculation as to the reasons for this hesitation in taking advantage of what is now a conspicuous example of rational and highly developed surgery. The lay public and the family medical attendant, the latter of whom by the way is a very powerful factor in the formation of public opinion, may care very little about the technical difficulties of this operation, but they are naturally very seriously concerned as to its dangers, and of these there is probably none that looms so large and menacing in their anxious eyes as that of hemorrhage. It is regrettable that tonsillectomy will probably always be a more or less bloody operation. The more one sees of the so-called "bloodless" operations the more

deeply is the impression apt to be forced upon him either that they are not a drop less bloody than those that make no claim to this alluring title, or that they can be called tonsillectomies only through the exercise of a generous amount of courtesy and charity.

I hope it will be clearly understood that I am not speaking of the serious or alarming hemorrhages, now happily extremely rare, that require ligation of vessels, suture of the pillars, or prolonged pressure, but only of the ordinary, what I may call the routine, hemorrhage that accompanies this operation. It is an accompaniment that has been so generally accepted as unavoidable that I think it not unlikely that a large number of operators have become more or less indifferent to it and, within safe limits, ignore it. But even though it be of what we would regard as of no more than ordinary degree, and may not in the least threaten the immediate safety of the patient, yet nevertheless there is quite a numerous type of patient to whom this otherwise insignificant blood loss may prove not dangerous perhaps but distinctly injurious. I mean that patient of almost any age whose general condition is decidedly asthenic, who is perhaps more or less septic as the result of the long-standing tonsillar infection, and who cannot afford to part with any more blood than he has to. In such cases the attending physician not only has to exercise considerable nicety of judgment, but he feels that he must assume a little more than his usual share of responsibility. Very often, indeed, he may regard himself as being reduced to the extremity of choosing between two evils—either that of a steadily increasing toxemia in his patient or that of the immediate stress upon his vitality that is inseparable from an operation of any kind. Of course, the throat surgeon will look upon the latter as very much the lesser of the two, but we may as well recognize that the family medical attendant recoils from it because of his natural though exaggerated fear of its hemorrhagic feature.

In order to banish this fear which has been the cause of so much procrastination and which is apt to cloud the judgment of many conscientious physicians, it is incumbent upon the surgeon to remove or to minimize so far as it may be possible the cause of it. It would be an unpardonable waste of time for me to discuss or even mention all of the many measures that have been employed by different operators for bringing about this very desirable consummation.

We have probably all of us investigated at one time or another the various serums and the several proprietary remedies for inducing rapid blood coagulation, the calcium salts, pituitrin, and a number of others that have in rapid succession knocked at the door of reputation. To me their action in restricting blood loss has seemed both so slight and so uncertain that I have abandoned them all and have searched in an entirely different channel for something more dependable, for whatever medication intended to lessen hemorrhage may be employed during the few days preceding operation, we well know that if the patient be allowed to come to the table nervous and apprehensive, and if the anesthetist be unskilled and unsympathetic, the possible good effect of the preoperative medication will be, in all probability, wholly nullified. Whereas, and we know this equally well, if the patient be enabled to enter the operating-room with perfect calmness and composure, free from all dread and, what is especially objectionable, the neurovascular excitement that attends it, and again if the anesthetist has that cheerful and quiet assurance of manner that marks the master of this art and gives his anesthetic unhurriedly and with much more regard for his patient's feelings and condition than for the tick of the operator's watch, the controlling effect of these several things upon the quantity of blood lost will be strikingly apparent.

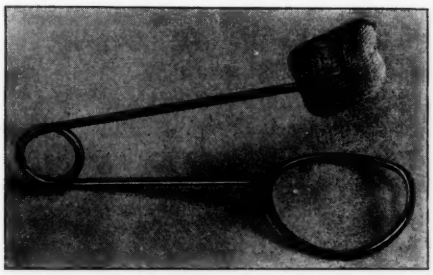
Few of us need reminding of the profuse bleeding and the consequent intense annoyance to the operator that are occasioned by the crude and almost brutal way in which some bizarre anesthetists perform their

office. The child that is needlessly frightened into screams and violent struggles to escape, the adult who is thrown into suffocative paroxysms of coughing or temporary apnea with a resultant marked degree of cyanosis, will inevitably bleed much more freely than they would do otherwise, and in doing so will both prolong the operation and greatly increase its difficulties.

Instead, therefore, of administering and depending upon those remedies that may or may not hasten hemostasis through their effect upon the composition of the blood, it has developed into a conviction with me that it is much more profitable simply to do all that we can to suppress nervous and vascular excitement. To occasional cases I think it not only admissible but judicious to give a half-hour previous to operation a single hypodermic of morphine gr. 1/6 and scopolamine gr. 1/150. The effect of this in favoring rapid and quiet anesthesia and in tranquilizing the reflexes makes it a very useful and at times valuable aid in throat surgery, but if one makes the mistake of giving the two drugs in larger doses than those mentioned the effect may be to lessen self-control and thus defeat the very object for which they are administered.

I have but one other suggestion to offer. At the beginning of a tonsillectomy, the faucial region being clear and quiet, the removal of the first tonsil can usually be effected with a speed and precision that are apt to be somewhat diminished when we engage the second. Even a moderate amount of bleeding from the first wound may obscure our field a little and necessitate occasional sponging or the use of a suction tube. Such interruption and delay can be almost entirely avoided and at the same time blood conservation promoted by the immediate introduction of the small clamp shown in the illustration. Without being at all in the way of the operator it will keep the wound and the throat dry and the removal of the second tonsil becomes as free from impediment as that of the first.

I dare say that this paper may sound to some of those who may read it more like a glorification of the anesthetist than any-



thing else, but while it undoubtedly is that to a certain extent, it is so only incidentally, because its main and, I hope, obvious purpose is to emphasize the blood-saving value of these easily applied measures of which I have spoken. Many operators I am aware don't bother about such things. To the ultra-scientific mind they may make little if any appeal, but to the more practical mind that carefully estimates the patient's vitality and that looks beyond the operation itself to the period of convalescence, blood conservation by whatever means it may be gained is eminently worth while.

THE TREATMENT OF PARALYSIS AGITANS WITH PARATHYROID GLAND.

BY WM. N. BERKELEY, A.B., PH.B., M.D., NEW YORK,

Attending Physician at the Good Samaritan Dispensary; Director, Laboratory of Experimental Medicine, Cornell Medical College.

Numbers of inquiries from physicians interested in the treatment of paralysis agitans continue to come to me, and I have thought it might not be uninteresting to readers of the THERAPEUTIC GAZETTE for me to report briefly once more my therapeutic experiences with parathyroid gland. I can perhaps offer no better introduction than to recapitulate some of the physiological details involved.

It may be briefly stated that when the parathyroid glands are removed from a dog or other suitable animal, a curious and characteristic train of symptoms follows—hurried respiration, tachycardia, profuse salivation, twitching and shivering of the voluntary muscles, rigidity, intermittent convulsions, rapid wasting, and death. There is now an enormous literature on the subject. A fairly complete bibliography may be compiled from the writings of Jeandelise, Pool, Erdheim, Berkeley and Beebe, and Ochsner and Thompson.

Physicians have of course not been slow to attempt the correlation of these remarkable symptoms with human convulsive diseases, and many tentative suggestions have been made. Tetany is unquestionably associated with the parathyroids in some way. But a further inquiry remains whether this be the *only* disease having any relation with these glands; and it is now quite a number of years ago since the Swedish neurologist, Lundborg, and I, working along different lines, and each independently of the other, conceived the idea that *paralysis agitans* is possibly due to some chronic disorder or disease of the parathyroid glands.

In support of this hypothesis I have offered the following considerations:

Paralysis agitans has all the marks of a chronic toxemia; the symptoms following parathyroidectomy are remarkably like those of paralysis agitans; in cases of myxedema and exophthalmic goitre, paralysis agitans has not infrequently occurred as a complication or sequela; a fair percentage of the reported autopsies have shown distinct changes in the parathyroid glands in the disease in question; and lastly a remarkable percentage of cases of paralysis agitans treated with properly identified fresh gland, or a properly made extract, have been greatly benefited.

Admittedly these considerations are by no means a demonstration of the etiological relation of shaking palsy to parathyroid insufficiency; but the hypothesis certainly comes within the bounds of reasonable scientific speculation.

As a source of supply for the remedy, the parathyroid glands of the horse are available in those countries where horse-meat is a popular flesh food, and where horses are slaughtered in well-conducted and officially inspected abattoirs. In this country the only glands generally available are those of the bullock.

As regards methods of preparation, I have elsewhere remarked on the haphazard and entirely unscientific way in which the ordinary parathyroid gland of commerce is prepared, and I have mentioned the successive steps through which I have labored in order to get a preparation which more nearly represents the unmodified gland. (I have used fresh glands with some success.) A medical associate writing me some years ago from Ohio told me of an elderly lady fed (at my suggestion) on fresh parathyroid, whose improvement was quite marvelous, and lasted over the entire time during which (about two years) she was under observation. Her pathetically stiff and motionless form became lifelike again, and she even recovered her singing voice. But fresh glands are very expensive, are not permanently palatable, and are not of course accessible to the great majority of patients. (Later on I made a long series of experiments with crude gland rubbed up with milk-sugar, but this method also be-

longs, as they say, "only to the history of the subject.")

Much the best preparation is an acetic extract of the fresh glands (commonly though very inaccurately called a "nucleo-proteid" extract), made by treating the ground or triturated glands with cold distilled water, filtering, and then precipitating with a very minute amount of acetic acid. The precipitate is quickly dried, and put away in the ice-chest. I have fully described the process in several articles published elsewhere.

This extract, in doses of one-fiftieth grain (either in capsule with milk-sugar, or as a hypodermic solution), is now for sale in a number of pharmaceutical houses in this city. It is not very expensive, and it comes nearer to the chemical constitution of the human gland than anything I have so far devised. It is absolutely without any secondary effects of a disagreeable nature. Among hundreds of patients I have known of but one or two who either had or thought they had an idiosyncrasy for parathyroid. The hypodermic solution in doses of one or two mils (one mil of the solution is arbitrarily made equal to one-fiftieth grain of the solid extract) does not even redden the skin if injected with reasonable care.

In the form in which I have recommended it, this remedy has been extensively prescribed during the last ten years. The cases now number well up in the hundreds, and it has been successfully shipped, so the dealers tell me, to all parts of the world. Further experience seems fully to justify the opinion I have formerly expressed, namely, that parathyroid gland is not a "cure" for Parkinson's disease, but that 60 to 70 per cent of the sufferers from the disease who have given the remedy a fair trial for from three to six months (it takes all of this time to test it) have been greatly benefited, and that in such cases the progress of the disease has been arrested, or very materially retarded. To counterbalance the occasional failures may be mentioned the occasional marvelous successes, such as that reported last February by Dr. George Martin, of Los Angeles. This patient was virtually raised from the dead in a few weeks. My formula for capsules did not do him much good, but the hypodermic solution was remarkably efficient.

If I may judge from year-long personal observation and experiment, there are no other internal secretions, either alone or in combination, which have any specifically beneficial effect in paralysis agitans. Among the older patients pineal gland is a useful stimulant for failing mental activity, and there is now on the market one extract of pancreas which is valuable in the peculiarly obstinate constipation these patients are afflicted with. But I cannot too strongly deprecate promiscuous dosing with thyroid, pituitary, and others of the internal secretions. Thyroid especially does serious harm. Even massage of the neck over the thyroid gland sometimes liberates into the circulation enough thyroid secretion to make the patient distinctly uncomfortable. This is, I imagine, why so many of these unfortunates come to me with the story that they have already been "almost killed" by the osteopaths.

Active exercise is of value to all patients who can take it without too great pain or fatigue; no exercise that overfatigues is good. A daily airing in a wheel-chair, or carriage, or motor is essential for those who cannot walk. For patients with sufficient means extensive traveling by easy stages is often of great benefit. The mental surroundings of the patient are very important. He should be cared for with sympathy and cheerfulness, and in the common event of psychasthenic fear, nervousness, or mental depression, an appeal to the reason, a resort to the consolations of religious faith, and such other rational resources as may be available, will prove of marked assistance.

As regards diet during the parathyroid treatment, I have made a multitude of experiments. I have kept patients upon an exclusive meat diet, an exclusive vegetable diet, a diet poor in calcium, a diet rich in calcium—all without the least effect upon the morbid condition. This is comparable to the curious fact that the *tetania parathyreopriva* of cabbage-fed rabbits is just as

violent as that of meat-fed dogs. I have finally concluded that the patient should be encouraged to eat freely of a mixed diet, taking in moderation anything that agrees with him, and contains enough "roughage" to relieve his constipation. When stimulation has been distinctly indicated, aërated Scotch whisky has given my patients more satisfaction than anything else.

After resort has been patiently had to a sufficiently long course of parathyroid treatment, and when this has been rationally supplemented by proper nursing, the patient generally attains within six months or a year to a stationary condition—not I think of "cure," but of very fair comfort—and remains thus (with continuance of the medication) for an indefinite period. If one recalls the pessimism with which the treatment of this dreadful disease was formerly regarded, it is not too much to say that medication with properly identified parathyroid has wrought a distinct advance.

134 East 62d Street.

DIABETES INSIPIDUS ASSOCIATED WITH HYPOPITUITARISM AND STRUCTURAL CHANGES IN THE SKULL, SHOWING THE EFFECT OF HYPOPHYSEAL EXTRACT ON THE EXCRETION OF URINE.[1]

BY HARVEY G. BECK, M.D., AND GEORGE McLEAN, M.D., Baltimore.

New interest has been aroused in the subject of diabetes insipidus owing to two important facts, namely, the discovery of the cause of this curious symptom-complex, and the effect of hypophyseal extract upon the chief symptom—polyuria. Since the establishment of the hypophyseal origin of the disease numerous cases have been reported in support of this view, and all clinical and experimental evidence conclusively demonstrates that it is the result of underfunctioning of the pars intermedia.

However, cases have been reported recently in which other endocrine glands were involved. The case reported herewith is one of the multiglandular type, in which there were symptoms pointing definitely to the hypophysis, thyroid, and gonads. Besides, the patient presented another symptom of unusual interest, namely, structural changes in the bones of the skull. Dr. Henry Christian recently reported a case of diabetes insipidus in a child, in which marked bone absorption of the skull had taken place, and quoted Schüller (*Fortschritte auf der Gebiete der Roentgenstrahlen,* vol. 23, 1915-16, p. 12), who called attention to the association of this condition with diabetes insipidus.

The action of hypophyseal extract is well emphasized in the accompanying chart. Although it was at first thought it would increase the elimination of urine, it is now definitely known that it decreases the amount in normal individuals, and in diabetes insipidus the effect in reducing the elimination is most striking.

For example, after the subcutaneous injection of one Cc. pituitrin the maximum fall of urine excreted was from 13,000 Cc. to 2000 Cc. in twenty-four hours. This observation as to the specificity of organotherapy is quite as remarkable in its quick response as the effect of thyroid gland substance in combating the hallucinatory disturbance in myxedema, and calcium salts in the tonic spasms in parathyroid tetany. In both these conditions the symptoms frequently disappear within twenty-four hours and can be easily controlled by treatment. Unfortunately, in diabetes insipidus, while the effect of pituitrin is as pronounced, it is not as permanent, lasting only a day or two, and oral medication has practically no influence.

The clinical findings in this case were as follows: Tertiary syphilis; adenomatous thyroid; diabetes insipidus; hypopituitarism; dystrophy adiposogenitalis; amenorrhea; hypotension; mitral systolic murmur; structural changes in the bones of the skull; gastric hyperacidity.

The patient reported for examination

[1]Reported at a meeting of the Baltimore City Medical Society, December 15, 1916.

October 12, 1916. The following is an abstract of the clinical history: The case is that of a female, single, twenty-four years of age. Family history negative. As a child she had scarlet fever and measles, and later occasional sick-headaches. Otherwise her health remained good until one and a half years previous to examination, when she had an attack of la grippe, following which she had amenorrhea. Five months later she noticed for the first time an excessive thirst, associated with increased elimination of urine. Her weight continued

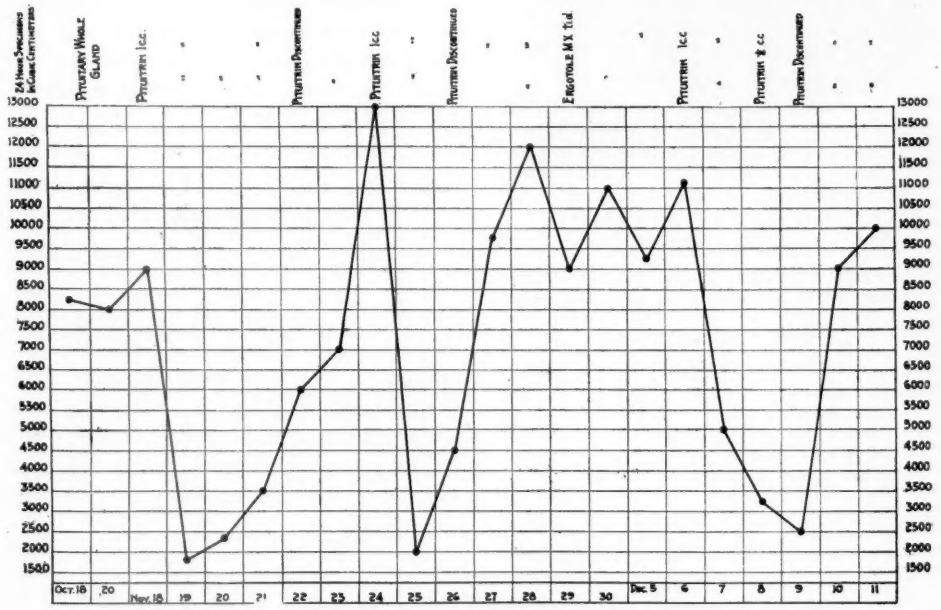


Chart showing effect of pituitrin on the excretion of urine in diabetes insipidus.

normal, averaging one hundred and five pounds, until two months previous to examination, when she discovered a rapid gain in weight without any increase of food intake. In five weeks her weight increased from one hundred and five to one hundred and twenty-seven pounds, and at the end of two months, at the time of examination, she weighed one hundred and thirty-three pounds. She stated that she had been in the habit of getting up four or five times during the night and voiding enormous quantities of urine and then drinking three glasses of water each time before returning to bed. She also complained of dyspnea on exertion, chronic fatigue, neuromuscular pains, drowsiness, mental irritability, and emotional disturbances; although she was gaining in weight her appetite was poor, and solid or liquid food caused epigastric discomfort, but no pain. Since the beginning of her illness her bowels had been constipated.

Physical examination: The patient had the characteristic white "alabaster skin." Large deposits of fat were distributed over hips, thighs, and lower abdomen; the breasts were increased in size and there was a cushion of fat over the shoulders. The face, neck, forearms, hands and feet were normal. The eyebrows were scant. There was a slight hypertrichosis of the face, more marked on the right than on the left side; otherwise the condition and distribution of hair was normal. The upper lids drooped. Pupilary action, ocular movements and eyegrounds were normal. There was a mild degree of oral sepsis, due to carious teeth. The thyroid was enlarged and nodular, the right side being larger than the left. The hands were steady and the fingers tapering. There was no trophic disturbance of the nails. The temperature was subnormal.

Examination of the heart and blood-vessels revealed a normal area of cardiac dulness, soft systolic functional murmur over base and apex, slow pulse, and a blood-pressure of 104 mm. systolic and 84 mm.

X-ray showing structural bone changes in the skull.

diastolic. The lungs were negative. There was slight pitting over tibias and patellar reflexes were sluggish. Superficial glands were not enlarged.

LABORATORY FINDINGS.

Gastric Analysis:

Time, 50 min.
Amount, 30 Cc.
Sediment, large.
Cardiospasm, positive.
Mucus, large amount.
HCl, 46.
Total acidity, 76.

Urine:

Amount in 24 hours varied from 8000 to 13,000 Cc.
Specific gravity, 1002 average.
Colorless.
Chemically and microscopically negative.

Blood:

Hemoglobin, 85%.
Erythrocytes, 4,338,000.
Leucocytes, 6,100.

Differential:

Polynuclears, 72%.
Small lymphocytes, 20%.
Large lymphocytes, 5%.
Eosinophiles, 3%.
Basophiles, 0%.

Wassermann: Positive.

Carbon dioxide tension alveolar air 35.

Roentgenological examination of cranium:

The lateral plate of the head shows the following conditions: Bones of cranial vault all unusually thick, not only in the posterior portion, where they are normally thick, but over the vault and anterior portion of the skull. The sella tursica is about normal size and depth. The anterior clinoid processes are somewhat nearer to the dorsum sella than normal. Sinuses are all normal.

No improvement followed the administration of intravenous salvarsan and mixed treatment of mercury and potassium iodide. Organotherapy failed to influence her fat dystrophy. Various measures were employed with the hope of decreasing her urinary elimination, all of which failed, with the exception of pituitrin, the results of which are recorded on the accompanying illustration.

A GENERAL SUMMARY OF THE THERAPEUTICS OF LEPROSY.

BY CHARLES GREENE CUMSTON, B.S., M.D.,

Privat-docent at the University of Geneva; Fellow of the Royal Society of Medicine of London; Honorary Member of the Surgical Society of Belgium; Associate Member of the Surgical Society of Switzerland, etc., Geneva, Switzerland.

The very considerable number of medicaments employed in leprosy manifestly demonstrates the fact that as yet no specific treatment has been found. Of the surgical treatment little can be said, and the same is true of opotherapy; therefore they will not be referred to, and the treatment with drugs of vegetable origin shall first be considered.

One of the most extensively used is chaulmoogra, which has been employed in India for centuries. It has been pointed out that young subjects support the oil well and that its action is most favorable when administered per os.

The oil of chaulmoogra is given by mouth or hypodermically, and although the latter method protects the integrity of the digestive tract, which should always be done in leprous subjects, it is to be recalled that subcutaneous administration of the drug has given rise to more or less serious accidents.

Brocq begins with five drops of the oil in the morning and evening either before or

after meals, and increases the dose 4 to 6 drops daily until 110 to 200 drops are taken in two or three doses in twenty-four hours. This maximum dose is continued for two to three months. The oil is given in hot tea or in an infusion of peppermint. It may be given in capsules containing 15 centigrammes.

Some patients bear the oil so well that they can take it *ad libitum*, and in certain countries, where chaulmoogra has the consistency of butter, patients can take it in the form of a bolus for months at a time without any ill result to the digestive tract.

The gastric intolerance set up sooner or later from the ingestion of the oil is to be treated by an exclusive milk or vegetable diet or by giving sodium bicarbonate with the oil. Other writers have found the lactic ferments satisfactory for postponing the gastrointestinal intolerance for the drug. The ferment is given night and morning with the oil, and this is followed by one or two spoonfuls of lemon or orange juice slightly sweetened. The patient is also advised to drink freely of lactose water.

Regardless of these precautions, patients do not tolerate chaulmoogra by mouth for any great length of time, but some Mexican writers maintain that gastric integrity may be preserved if the patient is kept on a milk diet, which at the same time assures proper renal functions.

Espada gives the following formula and directions:

Ol. chaulmoogra, 250 grammes;
Acid. carbol. cryst., 0.10 gramme.

The patient is put on an exclusive milk diet (3 to 4 liters daily, taken frequently in small amounts), and the first day of treatment is given 10 drops of the above formula in hot tea or an infusion of peppermint. On the succeeding days the dose is increased two drops daily, and the number of drops is progressively increased four to five drops thrice daily, so that at the end of ten weeks the total daily amount of the oil will have gradually reached 45 grammes. The medication is then stopped and the patient ordered a substantial diet.

The improvement does not become really distinct until the patient has been taking 45-gramme doses for several days, but from this time on the progress toward a cure is rapid.

It should be pointed out that this intensive medication may give rise to diarrhea, although the stomach remains intact, and in order to control the intestinal flux Espada advises stopping treatment until the bowels are once more in a normal condition.

In order to facilitate the ingestion of chaulmoogra it has been given in keratin-coated pills of 15 centigrammes each, to which some menthol may be added to subdue the colic produced by the oil. From 5 to 10 pills are given daily at first, and the number is progressively increased until 30 or even 40 are taken in twenty-four hours.

Guerrero Pérez believes that subcutaneous or intramuscular injections of the oil should be preferred if the patient is willing. Tourtoulis Bey of Cairo was one of the first to use subcutaneous injections of the drug. In five years he gave 650 injections to one of his patients; they were given in the external aspect of the arms and thighs with a long needle, and according to this writer there was little pain, while the swelling at the site of the injection disappeared within twenty-four hours, and in no case did abscess develop.

Strict asepsis must be observed. The oil is put up in ampullæ and sterilized. Before using the ampullæ are put in water sufficiently hot to render the oil fluid for injection.

Pellizari has treated lepers by this procedure with satisfactory results. In one case treated in collaboration with Dacco, they obtained good results as far as the general health of the patient was concerned, but the lesions of the integuments were not influenced by the treatment. In this particular case each injection was followed by a rise in temperature which lasted for two days, and the patient was fatigued and depressed.

Hallopeau, Du Castel, Brocq, Jeanselme

and others have employed intramuscular injections of the oil, and although recognizing that the drug has no specific action on leprosy, Hallopeau admits that given either by mouth or injections it exercises a favorable influence on the disease.

Du Castel and others have pointed out the danger of pulmonary fat embolus with a tendency to syncope following intramuscular injections of the oil. The method has also been decried on account of severe inflammatory reaction taking place in the connective tissue, giving rise to painful indurated nodes which persist for some time. These untoward effects are in part due to massive doses and partly to the impurity of the oil. To overcome these complications, Jeanselme, Brocq and Pomaret have adopted certain formulæ, Jeanselme in particular having found the following satisfactory:

Ol. chaulmoogra, washed in alcohol, filtered on cotton, and sterilized at 100° C., 1 part;
Compound oil, 1 part.

The compound oil referred to, which is used as the excipient for the chaulmoogra oil, is composed as follows:

Guaiacol, 50 centigrammes;
Camphor, 25 centigrammes;
Ol. vaselin, sterilized and filtered,
Vaselin, sterilized and filtered, ää 5 grammes.

One Cc. of this preparation represents about 23 drops, and a dose of 6 Cc. is injected twice a week. Jeanselme says that there is little pain, and that the injections may be continued indefinitely and have never given rise to fat embolus.

In order to avoid painful phenomena, Brocq and Pomaret use the following preparation: The oil is liquefied by mild heat. Then in a graduated tube pour 80 Cc. of the oil and added eucalyptol q. s. ad 100 Cc. Shake the mixture and filter. The eucalyptol becomes intimately mixed with the chaulmoogra oil, and, strange to say, the mixture remains liquid at all temperatures. It is put up in 2 Cc. ampullæ.

Dyer combines chaulmoogra with strychnine and considers the alkaloid as a *sine qua non* of the treatment of leprosy. He administers the drugs both by mouth and subcutaneously.

It is, undoubtedly, by its tonic effect that the strychnine is of value in leprosy, and it may be advantageously alternated with injections of camphorated oil.

At the Désirade Hospital, Noël has resorted to the following formula:

Ol. chaulmoogra, 3 grammes;
Acidi gynocardic, 1.20 grammes;
Strychnine sulph., 10 milligrammes;
Magnes. calcinat., 30 milligrammes;
Gum arabic, 9 grammes.

F. s. a. pil. No. XXIV. Begin with 4 to 6 pills daily and increase progressively until 24 pills are taken *pro die*.

This treatment is continued until the first symptoms of strychninism appear (salivation, repeated cold sweating, slight rigidity, etc.). The pills are then given *without* strychnine at the dose of 24 *pro die*, and at the end of a week a purgative is given. On the day following the pills containing strychnine are renewed, and thus the treatment is continued. An amelioration will not be noted until the treatment has been continued for six months, and it should be kept up for four years at the rate of two months' treatment out of every three.

Leboeuf has employed chaulmoogra on a large scale in the Canacs of the Caledonian Archipelago, and he believes that, with the exception of contraindications, it is the treatment of leprosy *par excellence*. Leboeuf points out that chaulmoogra is very much more powerful in its effect among the Canacs than in Europeans. He recommends the following formula:

Ol. olivæ, 60 Cc.;
Ol. chaulmoograe, 925 grammes;
Sulphuris præcip., 15 grammes.

D. S.: One or two dessertspoonfuls a day for an adult.

All the improvements or even almost cures that this writer has observed have been obtained with this dose, because, as Leboeuf rightly says, it is not necessary to resort to massive doses of the oil which are so commonly advocated in order to be efficacious.

Heisser, in the Philippines, has employed

the oil of chaulmoogra combined with camphorated resorcin with good results. The first case was a girl, aged eleven years, who presented large maculæ and leprides over both legs from the malleolæ to the knees, with similar lesions on both forearms.

As the patient was intolerant to chaulmoogra given by mouth, Heisser resorted to subcutaneous injections of the oil combined with camphorated resorcin oil. The injections were given once a week, beginning with 1 Cc. and progressively reaching 12 Cc. in three months. The dose was then progressively diminished until 1 Cc. was reached. The injections were then repeated as before until the maximum dose of 12 Cc. given during the first series was gone beyond.

Some time after the leprides ulcerated, but were not long in cicatrizing. The treatment was continued for eight months.

Heisser's second case was a patient aged forty years. He presented leprous infiltrations over the external aspect of both legs and thickening of the lobule of the left ear. The treatment with the chaulmoogra-resorcin-camphor oil injections was continued for two years, after which time all apparent lesions had disappeared.

Since June, 1914, Balzer has resorted to a treatment in his leper service at the St. Louis Hospital, Paris, consisting of the internal exhibition of chaulmoogra oil, combined with intramuscular injections of the following formula:

Resorcin, 1 gramme;
Ol. camphorat., 10%, 30 grammes.

D. S.: Two cubic centimeters for one injection, to be repeated three times a week.

Of ten patients treated by this method, seven seem to have been really benefited, but Balzer questions whether or not this apparent benefit may not be simply a lull in the evolution, so frequently met with in leprosy. However, he is of the opinion that the association of chaulmoogra and camphorated resorcin has a favorable action on the progress of the lesions.

Guerrero Pérez has employed chaulmoogra and gomenol oil in local injections in two cases. The drugs were injected separately, although they mix readily. This was done because the reaction produced by each drug could be studied separately. In these particular cases the reaction was only slight, this being probably due to the relatively small doses of chaulmoogra injected. Pérez agrees with Leboeuf that it is not necessary to employ large doses of chaulmoogra, particularly when it is associated with some other drug having a favorable action on leprosy.

The dose of gomenol employed was 10 Cc. of a 10-per-cent solution in olive oil distributed in the lesions of a given area. The chaulmoogra and gomenol were injected simultaneously in the right thigh and leg. Next the upper limbs were injected, following the same rule as for the lower limb. Finally, when the starting point was reached the gomenol was injected where the chaulmoogra had been given, and *vice versa,* doing this for all four members and trunk.

The chaulmoogra was sterilized and made tepid before injecting so as to render it fluid, and both it and the gomenol were injected around the infiltrations and the more or less circumscribed lesions.

The active principle of chaulmoogra appears to be gynocardic acid, and this product can be given by mouth or subcutaneously. Internally it is exhibited in capsules containing 5 milligrammes of the acid and 20 centigrammes of oil of chaulmoogra. Begin with two capsules and increase the dose progressively to 20 or even 30 capsules *pro die,* or the following pills may be given:

Gynocardic acid, 25 milligrammes;
Ext. gentian, 75 milligrammes;
Ext. of hops, 75 milligrammes.

S.: For one pill.

Two pills are given daily and progressively increased to 10 *pro die* (Desprez).

Other writers employ gynocardate of sodium or magnesium at the dose of from 10 to 20 centigrammes, while as an external application the following may be prescribed:

Acid. gynocardic, 1 gramme;
Vaselin, 30 grammes;
Ung. simpl., q. s.

Or chaulmoogra oil can also be added to the prescription.

Although better tolerated by the digestive tract than chaulmoogra oil, gynocardic acid is far from being as efficacious as the oil and therefore its use has been rather limited.

Engel Bey has proposed substituting chaulmoogra oil for antileprol, or the ethylic ether of gynocardic acid. It can be given by mouth or subcutaneously. By mouth it is given in capsules of 50 centigrammes or 1 gramme each, 5 to 10 capsules being taken *pro die* until the daily dose of 5 grammes is attained.

Piccardi states that he has obtained better results with this drug than with chaulmoogra oil and that it is better tolerated. This writer treated six patients with this drug, but only three followed the treatment for a sufficient length of time to be able to draw any conclusions. The results obtained in these three cases were an improvement in the general condition with an increase of weight and cicatrization of the ulcerated nodules; a gradual absorption of the non-ulcerated nodules, which left only a dark-yellow spot at their former site; return of sensitiveness to pain in areas where it had disappeared or had decreased. Respiration became free from absorption of the lepromata obstructing the nasal fossæ, while cough and hoarseness disappeared. During treatment the writer noted eruptions and more or less turgescent painful nodules, which disappeared in three or four days.

Successive examinations made from biopsies undertaken at various periods of treatment showed a gradual decrease in the number of bacilli and finally their total disappearance.

Piccardi concludes that antileprol is a specific of leprosy because (*a*) there is a gradual disappearance of the bacilli, and (*b*) from the fact that during treatment abacillary nodules develop, these being probably due to a reaction produced by endotoxins put in circulation by the cadavers of the bacilli.

Serra states that he has never had the same untoward effects with antileprol as he has had with chaulmoogra oil. He has seen ulcerated lepromata disappear, leaving after them only a brownish spot at their former site. Serra also witnessed the degeneration of the bacilli followed by their disappearance in the nasal mucosa and lepromatous infiltrations.

Hoang-nan is a creeping plant found in Annam. Lesserteur says that in Tonkin the natives use hoang-nan mixed with equal parts of alum in several diseases, and among them leprosy. This mixture is made into pills of about 25 centigrammes each. To begin, half of a pill is given morning and night, while the dose is increased to one pill night and morning the following day, and then increased each day by two pills until the dose of five or six pills morning and evening is reached. Then the medication is suspended for ten days, to be recommenced as before, only a larger daily dose than the previous maximum one is attained. This maximum dose must not be continued for more than seven or eight successive days, particularly when the patient is not robust.

These pills are ordinarily given with a little vinegar, which facilitates their dissolution in the stomach. All alcoholic drinks of every description must be positively proscribed.

I would add, however, that this drug has not given encouraging results to European physicians who have tried it; at all events the results obtained have been greatly inferior to those accruing from chaulmoogra oil. Brocq is of the opinion that hoang-nan is a dangerous medicament to handle.

Oil of gurjun was first employed in gonorrheal urethral injections, and in 1874 it was first used in leprosy by Dougall of Port Blair. Two years later he published the notes of twenty-five cases of leprosy treated with this drug, and he affirmed that he had met with very satisfactory results. Internally he prescribed:

Ol. gurjun,
Milk of lime, ää equal parts.

He commenced with a dose of 1 to 2 Cc., which was gradually increased to 6 Cc. Larger doses gave rise to nausea.

For external applications Dougall ordered:

Ol. gurjun, 1 part;
Milk of lime, 3 parts.

Rub the diseased parts night and morning.

This treatment never became general. However, it has been resorted to with advantage when chaulmoogra oil could not be tolerated by the patient.

Vidal formulates the drug as follows:

Bal. gurjun,
Gum arabic, ää 4 grammes;
Syr. menth. pip., 12 grammes;
Infus. anis., 60 grammes.

M. D. S.: To be taken in two doses; after each dose drink immediately some wine or liquor in order to obtain gastric tolerance.

Dyce, Espinet and Hillis speak favorably of oil of gurjun in leprosy. The latter even maintains that this substance can be used in all the forms of the disease, that it can delay or arrest its ravages in some cases, while in others it may procure an apparent cure.

Trin of London has used balsam gurjun internally, combined with Fowler's solution. For external application he uses a 5-per-cent pyrogallol ointment on the foci of disease. He is satisfied with the results obtained.

The peasants of Camaguey, Cuba, have employed the bark of the red mangle tree for leprosy, and some Latin-American physicians have likewise advised its use. The fluid extract is given at the daily dose of 240 Cc. (℥ viij), while externally as a wash it is given in a 30-per-cent watery solution. The soft extract is exhibited at the dose of from 12 to 15 grammes in twenty-four hours in the form of a bolus or pills made with extract of gentian.

According to Duque of Havana, the favorable effects of this bark are made manifest by (1) the return of the appetite and an increase in weight, and (2) by the gradual disappearance of the erythemato-pigment spots and the infiltrations, and occasionally a return of the sensibility. The tubercles disappear either by a process of absorption or ulceration.

But the treatment must be kept up indefinitely.

Eucalyptol has been used on a large scale by Amaral and Paranhos in Brazil. They have given it in intramuscular injections at the dose of 2 to 3 Cc. three times a week, combined with olive oil, equal parts. This medication gives strength to the patient, reduces the size of the tubercles, facilitates the absorption of the areas of infiltration, and above all decreases the phenomena of organic intoxication, so common in leprosy.

Finally, patients in a cachectic state, with severe diarrhea, obliging them to remain in bed, are soon greatly improved by eucalyptol. According to Amaral and Paranhos, thirty intramuscular injections are enough to make certain patients increase 15 to 18 kilogrammes in weight.

Eucalyptol is one of the most extensively used drugs in the leper service of the Guapira hospital and it appears to be highly esteemed in Hawaii. It is also currently used in some of the services at the St. Louis Hospital at Paris.

Row of Queensland maintains that guaiacol has a specific action on the bacillus lepræ. He has treated 31 patients with guaiacol (in oil) injections given in the tissues around the lepromata. The ordinary dose is 5 Cc. given three times a day, but this total daily amount of 15 Cc. is to be gradually reached.

In fortunate cases the favorable influence of the drug may be seen toward the fourth month of treatment. The lepromata become turgid and soft, the softening commencing at the center and little by little invading the nodule.

The maximum dose of guaiacol may give rise to very marked depression, and in order to overcome this Row gives some whisky to his patients, and, of course, to diminish the dose if suppuration of the leprous lesions ensues.

Having completed the list of drugs derived from the vegetable kingdom for the treatment of leprosy, we shall now examine the medicaments of mineral origin that have been employed in this disease, the first of which is mercury. This drug was first used by Heaslund about 1892 in hypodermic injections and in inunctions. He mentions one case which greatly improved under the use of 1 Cc. Hg formanide in daily intramuscular injections, sodium salicylate by mouth, and inunctions with ichthyol ointment.

The patient in question had a tuberous leprosy, and the laryngeal lesions retrogressed rapidly under the treatment above outlined.

In 1896 Crocker reported some cases in which the lepromata disappeared from the use of sublimate injections, while Neish, following Crocker's method in 66 cases, found that after four months' treatment an improvement was manifest. There was a partial return of sensibility, a rapid cicatrization of the ulcers, and the patients became cheerful.

Brault of Algiers has employed calomel and Hg benzoate in some cases of leprosy, and although he obtained some improvement he points out that too much faith must not be placed in this treatment.

Lucca has treated seven cases with calomel, and in all he obtained a complete and rapid cicatrization of the ulcers, but these recurred more or less slowly at a later date. He obtained, however, an unquestionable improvement in the sensibility in one of the cases, and in another there was a marked retrogression of the muscular atrophy. The general condition of all the patients became better, but on the other hand no change took place either in the lepromata or nonulcerated leprides, excepting in a single case in which the former seemed to flatten out.

Gravanga administered large doses of Hg to several lepers, and he makes the following highly interesting statement, namely, that he systematically examined the blood of all his cases for the bacillus lepræ before mercurial treatment was begun and found the organism. This is all the more interesting because the researches were undertaken in subjects who had not had any new eruption of the affection for at least three months. After an intensive mercurial treatment the blood no longer contained the bacillus.

Meyer has treated several cases in Brault's (Algiers) service with various mercurial salts. He observed an absorption of the infiltrations, a flattening out of the lepromata, and cicatrization of the ulcers. He advises watching the urine throughout the treatment on account of the frequency of renal lesions in lepers.

Balzer of Paris employed hectargyre in a leprous female with syphilis. The syphilitic lesions disappeared, but no appreciable change took place in the leprous lesions.

Truc of Montpellier has related the case of a leprous patient with ocular lesions which were cured by intravenous injections of Hg cyanide. The patient, aged thirty-two years, had had an enucleation of the left eye performed on account of an exudative nodular iridochoroiditis, and the remaining eye presented the same lesions. This patient had previously been given antileprous treatments without any result. He presented lesions on the face which contained Hansen's bacillus. He was given 15 intravenous injections of 2 Cc. Hg cyanide and the ocular lesions disappeared.

The good effects of Hg cyanide in leprosy have also been referred to by Gaucher.

In spite of the contradiction existing in the above mentioned data, it may be assumed that mercury really possesses an influence on leprous lesions. When this action does not take place, Hg has no other untoward effect in leprosy than involving the renal integrity, but if ordinary precautions are taken in this respect the drugs can be safely used.

Danielson has used KI in order to verify the cure of patients afflicted with *spedalskhed,* and by Leredde and Pantrier to facilitate the search for the bacillus lepræ in the nasal mucus. Of late it has

been employed as a therapeutic agent in the disease. Siebert, who has studied the action of the iodide of potassium in several lepers, has shown that if in some patients this salt acts as an extremely sensitive reagent, it may on the other hand have no action whatsoever, while in still other cases its action becomes manifest only after it has been exhibited in frequently repeated large doses. However, Siebert believes that marked improvement can be obtained by the judicious use of KI.

Marchoux and Bourret believe in the happy action of this salt in leprosy, and relate the case of a young girl who took one gramme KI on two successive days. This dose gave rise to a violent reaction in the shape of large indurated patches, nodules which ultimately underwent ulceration, a temperature of 104° F., and clusters of bacilli in the nasal mucus. These accidents subsided in a few days and the lesions returned to the same state prior to the exhibition of KI—that is to say, some pigmented spots, a few young nodules, some old suppurating nodules, and bacilli in the nasal mucus. The iodide test was renewed on several occasions with always identical results, but the violence of the reaction decreased. The writers conclude that KI has rather a favorable action on leprous lesions and only becomes harmful if the reaction is not kept within control.

Referring to KI, Montel is of the opinion that this salt has a distinctly favorable action on the evolution of the symptoms of leprosy. He prescribes it in association with chaulmoogra oil and offers the following formula:

KI, 10 grammes;
Strychnin. sulph., 40 milligrammes;
Sodic. methylarsenat., 150 milligrammes;
Aq. q. s. ad. 309 Cc.

M. D. S.: Two soupspoonfuls a day.

In a patient who took this potion, Montel observed a very sharp febrile reaction with a marked exacerbation of all the symptoms. The reaction lasted four days and was followed by a satisfactory change in the lesions. They all underwent an involution with the exception of the ulcerations and the anesthesia.

In another case with erythemato-pigmented leprides, KI gave rise to a very violent reaction with an evident aggravation of the lesions. But when the medication was stopped it was noted that the lesions desquamated and became pale. On the whole there was an improvement from the KI.

Leboeuf has also experimented with KI in a large number of lepers presenting all forms and all ages of the disease. He divides the patients into three classes: (1) Those who do not react to no matter what dose of KI; (2) those who offer or not a febrile reaction according to the quantity of KI exhibited; and (3) those who react from a small dose (1 to 2 centigrammes *per diem*).

Patients of the first class are relatively rare. In the third class the most varied forms of the disease will be encountered, but generally speaking they are usually very advanced cases of the affection in which the tuberculous element predominates.

Leboeuf concludes that the exhibition of KI should not be continued if a rise of temperature of more than 104° F. occurs. The exhibition of the salt should be for about ten to twelve days, even if the temperature does not go above 102.5° F. The action of the salt must be very carefully watched, even if there is apyrexia.

(*To be continued.*)

TREATMENT OF ACNE VULGARIS.

RAVOGLI, in the *Ohio State Medical Journal* for December, 1918, calls attention to the fact that the possibility of a specific to conquer acne has often been suggested. When acne bacillus was found, a vaccine from its culture was offered to the profession as specific against acne. The pure acne-bacillus vaccine and the polyvalent vaccine with acne bacillus and staphylococcus have been used. They have been failures, and in Ravogli's experience the

most aggravated cases of acne indurata have nearly all received from twenty to forty injections of those vaccines. It seems that his experience is much like that of Dr. McDonnell, who could not see any yielding of the eruption to the use of the vaccines.

In Ravogli's practice he usually finds his patients in a run-down condition, some from an inopportune diet, depriving themselves of the nitrogenous and fatty food, limiting themselves to carbohydrate diet. In a great number of cases constipation is the principal complaint; in only a few cases the digestion is slightly impaired by gastric catarrh with hyperacidity. To improve the condition of the stomach, to diminish the hyperacidity, he gives to the patient powders with 1/5 grain of calomel and 3 to 5 grains of bicarbonate of sodium in water three times a day. These powders usually clean the tongue, and have also a mild cathartic effect. If the patient is still costive, he gives him in the morning early:

Magnesium sulphate, ℥ij;
Acid sulphuric dilute, drops x;
Tincture of rhei, f℥j;
Peppermint water, f℥iij.

M. S. Two tablespoonfuls in the morning diluted in water.

As soon as the stomach is in better condition the patient eats well; then is the appropriate time to give some tonics. In many cases the compound syrup of hypophosphites, one teaspoonful after each meal in one wineglassful of water, has usually given satisfactory results. We can give a few drops of tincture of iron and tincture of nux vomica. The appetite is increased and the digestion is favored.

Ravogli washes the face with a tincture of green soap; then it is cleaned with an alcoholic mixture of phenol. He finds the principal local treatment to consist in the opening of the pustules and the squeezing out of their contents. This is done with a triangular point, either with a small curette or with comedo extractor, and contents are removed. In cases of acne indurata, when deep, hard abscesses are present, with a thin bistoury the abscesses are opened, and with a small curette the contents are scraped off.

In a case of simple acne he lets the pustules open, washes the face with a solution of borate of sodium, and then applies a layer of unguentum zinci benzoatis to protect the little wound. If the bleeding does not stop, then he uses a solution of coagulen, or hemoplastine lapenta, which covers the wounds with a gluish film.

The best application during the night is a sulphur salve, a modified Lassar paste. He uses

Flowers of sulphur,
Zinc oxide, ää ℥j;
Starch, ℥ss;
Acid salicylic, gr. x to xv;
Vaselin, ℥j.

This is spread on the face as a paste and is kept on with a bandage. In case of acne indurata, when the face and the neck are studded with hard nodules, a stronger application is required, and for this purpose he uses a salve consisting of one drachm of ichthyol in one ounce of unguentum diachyl (Hebra.). This is spread on gauze and applied, leaving it the whole night.

In the morning the salve is removed from the face, the neck is poulticed with hot moist towels, then is washed with green soap. After this is done he applies a lotion of carbolic acid, as follows:

Phenol, 4 p. c., f℥j;
Glycerin, f℥j;
Rose water, f℥iij;
Alcohol, f℥iij.

This is applied for two or three minutes; then the part is dried, and a little rice powder is applied. The patient can then go to his or her occupation.

The opening of the pustules is done once a week. In some cases when many comedones are aggregated, with a dull curette the skin is scraped to remove the superficial comedones.

In his experience, after a few treatments the patient has gained considerably. He is advised to be treated any time he sees new pustules forming, preventing in this way new infection.

The method is old, but it gives, in Ravogli's hands, much better results than all the other modes of treatment.

EDITORIAL.

RELIEVING THE PAINS OF LABOR.

The extraordinary degree of interest manifested by the profession and laity in the so-called "twilight sleep" designed to give comfort to the parturient woman serves to emphasize, if such emphasis was needed, the natural demand for making a physiological process less painful. Readers of the THERAPEUTIC GAZETTE will, we think, agree with us in the statement that "twilight sleep," except it be induced in an institution where all the accessory rules necessary to its success can be adhered to, has been weighed in the balance and found wanting. It undoubtedly increases the danger to the child, in some instances makes the mother difficult to control, and, in reality, induces a mental state which results in the patient forgetting the pain through which she has passed rather than actually affording her an escape from real suffering. Ever since "twilight sleep" was first introduced we have tried to be impartial in publishing reports favorable and unfavorable to its employment, and the conclusions at which we have arrived are based in large part on the Progress items which we have published.

With many practitioners chloroform is still the drug of choice because of its efficiency, and also because in this type of cases patients seem to be singularly immune to those effects which in ordinary surgical cases sometimes result disastrously. Apart, however, from the immediate dangers of chloroform the obstetrician must consider the deleterious effect of this drug upon the tissues of the body, notably the liver; the organ which is particularly prone to be perverted in its function and sometimes actually diseased in the later stages of pregnancy. For this and other reasons the practitioner is still seeking for a satisfactory anesthetic.

A careful review of the literature of the last few years will, we think, convince the average mind that nitrous oxide gas, when given with oxygen by one who is trained in the administration of these two gases, is an excellent anesthetic for the parturient woman. So, too, we think that the unbiased observer or student of the subject will admit that the cost of the gas, and more particularly of the apparatus, as well as the bulk of the tanks and attachments, militate against the general employment of nitrous oxide and oxygen.

A valuable presentation of this whole subject has recently appeared in the *Chicago Medical Recorder,* being a symposium on anesthesia by a number of men who have had a large experience. Thus Scott quotes the report of Danforth upon 469 labor cases in which gas-oxygen was given over periods varying from five minutes to seven hours. He had unsatisfactory results in only 7.5 per cent of the entire number, and of these 7.5 per cent the proportion of failures was more largely due to the complications of the labor than the failure of the anesthetic. Subsequent to the report of Danforth just referred to, Scott reports 366 additional labors, 226 of which were carried out under gas-oxygen alone, 101 had gas-oxygen plus some ether, and 39 had no anesthetic. The average period of anesthesia in these cases varied from five minutes to two hours, with no mortality because of the anesthetic.

The advantages which Scott claims for this method are the avoidance of the profuse sweating often induced by ether, the avoidance of after-effects varying from nausea to pneumonia, and the possibility of aiding cyanotic babies by giving them an extra amount of oxygen gas through the mother's blood stream, prior to section of the cord. Other advantages are the rapidity with which pain is relieved and the absence of ill effects on both the mother and the child.

Scott states that the gas-oxygen is started

at the beginning of the second stage of labor, but is given only with each uterine contraction. The signal for the administration of the gas is the beginning of the contraction, and not the patient's complaint of pain. This he believes is the secret of its successful use, for if the gas is given too late the patient feels very little benefit from it. Some patients are relieved of pain with only the two inhalations, while others require six or seven. Toward the end of labor Scott admits that the results have been rendered more satisfactory by the addition of a little ether to the mixture of gas and oxygen, since this gives more relaxation. As most of the best modern gas-oxygen forms of apparatus have an attachment by which ether may be added in small amounts carefully graduated the patient does not recognize that this drug is being used.

These statements by Scott illustrate what we have already said in regard to the efficiency of this method where one who is skilled in the use of gas-oxygen can be obtained to assist the obstetrician, which is another way of saying that where the parturient woman can be delivered in a properly equipped hospital the pangs of labor can be materially diminished.

In the discussion of this paper Danforth emphasized the value of gas when labor is to be induced.

In another paper contributed by a trained nurse to the same symposium emphasis is laid upon the fact that in the hands of a novice nitrous oxide is a dangerous anesthetic. It should be given slowly and increased slowly. If the patient becomes cyanotic, it is often because she is having too much nitrous oxide, and this is made the more certain if there are spasms and jerking movements. The lower jaw is apt to fall a little and should be gently supported. Too much rebreathing without oxygen may cause cyanosis also. Rebreathing is distinctly advantageous in some cases because the moderate accumulation of CO_2 stimulates respiration. If the patient becomes talkative she is usually getting too much air.

TUBERCULOSIS OF THE MESENTERIC GLANDS.

Long before the discovery of the bacillus tuberculosis enlargement of the mesenteric glands due to this infection was recognized and received the name of tabes mesenterica. The discovery of the bacillus tuberculosis and the fact that a large proportion of the cases of this disease is due to the ingestion of tubercle bacilli in food served to make our conception of this malady clearer, the more so when it was found that tuberculosis could be acquired by the use of milk from infected cows. In this connection it is interesting also to recall that tubercle bacilli can pass through the intestinal wall without any demonstrable lesion of the mucous membrane, and therefore very grave disease of the mesenteric glands may be present without lesions of the intestinal mucous membrane being found. Other points of importance are that tuberculosis of these glands very commonly occurs before any other evidence of the infection can be discovered. Last of all, it is noteworthy that the glands which are chiefly affected, except in those cases in which there is very wide-spread disease, occur in that portion of the mesentery which contains the lymphatics which drain the ileocecal region.

In a paper published by Carson in the *Lancet* it is shown that the changes in these glands are practically identical with the change seen in similarly affected glands in other parts of the body. Out of 50 cases studied by him, the youngest was thirty-eight months and the oldest thirty-eight years, but 8 cases occurred between one and five, 14 between five and ten, 15 between ten and fifteen years. It is also interesting to note that 30 of these patients had a history of illness varying from two weeks to three years in duration. The symptom which was predominant was pain, and Carson thinks that this pain is absolutely typical, describing it as a sudden centralized abdominal pain severe enough to make the child cry, recurring sometimes two or three times, lasting for fifteen min-

utes or less, and stopping suddenly with intervals of complete relief. Pains may occur every day or once a month, and he believes that the explanation is not that a condition of tuberculous peritonitis is present, as some have thought, but that it is of the nature of a colic induced by irritation of the nerve fibers supplying the muscles of the intestinal wall. Indeed, he reports three cases of intussusception in which the lesion occurred directly opposite the affected glands, and in one patient suffering from this disease he saw the intussusception take place twice within a minute or two while he was operating. Carson does not think that the examination through the abdominal wall is ever very satisfactory, but occasionally an *x*-ray examination will show a calcareous gland.

Appendicitis and the ordinary digestive disorders of childhood, with or without the presence of intestinal parasites, may produce somewhat similar symptoms which must be carefully excluded.

In a journal devoted to therapeutics the statements so far made would be in part out of place if they did not lead to some therapeutic indication. Carson divides these patients into two types, those with complications and those without, the chief complication being some form of intestinal obstruction which, of course, demands operative interference. If it is believed that the condition is part of a general tuberculous infection, purely medical treatment may be wise, but Carson manifestly is in favor of surgery, particularly as so many cases of tuberculosis of the peritoneum are curable by laparotomy. On the other hand, it is important to remember that cases of tuberculosis of the mesenteric glands show a tendency to spontaneous recovery. In patients who fail to improve, exploratory operation, which is often curative in itself, may permit the excision of the infected glands. Carson is strongly of the opinion that an operation which results in the formation of an artificial anus in a case of this nature, or which leaves a short circuit, is sure to be a failure, and therefore goes so far as to advise the performance of enterectomy, removing the glands attached at the same time, and also breaking up adhesions. Out of the three cases in which this operation was done, two recovered.

The difficulty which we see in Carson's suggestion lies in his admission that definite early diagnosis is difficult, and in his further admission that a great number of widely scattered glands, too large a number to be excised, may make a cure impossible by surgical measures. Sunshine, to which the abdomen may be directly exposed, careful feeding for the purpose of improving nutrition and vital resistance, and the use of iron and arsenic are the medicinal measures which we would suggest.

THE TREATMENT OF EMPYEMA.

On a number of occasions in the past we have stated our belief that in the presence of a large accumulation of pus in the chest it is the part of wisdom to remove some of this by aspiration, before proceeding to the ordinary surgical measures consisting in incision of the tissues, and excision of a rib. In many instances this relief of pressure should be followed by several days of inaction before complete surgical measures are instituted, since by this means an approximately normal replacement of the thoracic organs may take place, and the relief of pressure in the chest results in removing the urgent symptoms from which the patient is suffering. In cases of tuberculous abscess, or empyema, we have seen this type of conservative surgery, whereby pressure symptoms were relieved, followed by great improvement in health and gain in weight, without any attempt having been made to empty the pleural cavity of its contents. In other words, the so-called cold abscess did best when left alone.

Our interest is aroused once more in this matter by the study of a large number of cases of empyema on the part of the U. S. Army Empyema Commission of Camp Lee, Virginia. This Commission, as a result of studying one hundred and forty

cases, reports that the mortality was only 4.3 per cent, which is much lower than the mortality elsewhere. Of course, it is possible that in these cases the infection was less virulent, but on the other hand it is interesting to note that in one case of death there were in addition to empyema multiple abscesses of the lungs, and in another case a very extensive suppurative pericarditis. Again, it is interesting to note that in every instance the hemolytic streptococcus was isolated, and therefore it is fair to assume that these infections were of more than ordinary virulence.

The point for emphasis, however, is that in place of immediate operative interference in cases of empyema early operation is not advisable. There is no need for it unless pressure symptoms are very urgent. If the operation is performed immediately after the fluid has formed it will often be discovered that it is not as yet purulent, and operating on it early may make it so. Again, early operation is prone to be followed by collapse of the lung, whereas late operation is less commonly complicated by this change, and the patient has an opportunity to rally from the acute illness through which he has passed. This Commission also found that early operation was more apt to result in infection of the blood stream through the wound by the microörganisms in the pus. In cases in which a single aspiration is followed by reaccumulation of fluid so that dyspnea ensues, the aspiration can be repeated again and again until the patient is in good shape for operation. Usually intervals of from two to six days between aspirations are the periods of choice, and this Commission found by the time of the fourth aspiration—that is, two or three weeks after the empyema had developed—that the fluid had, changed from a thin, almost transparent, quality to definite pus. The pneumonia had largely cleared up, the general condition of the patient improved, and therefore radical treatment could be resorted to with comparative safety. In other words, this Commission is strongly of the opinion that late operation is much to be preferred to early interference, the more so because after early operation pockets, adhesions and other complications are more prone to develop than where the two layers of the pleura are kept apart by the presence of fluid.

Another interesting detail of this report is that the radical secondary operations of Estlander and Schede, and others, have not been found necessary. While the needs of each case must be considered separately in the majority of instances, it is best to incise in the eighth intercostal space just behind the posterior axillary line. This incision should be from two to four inches long. It is not always necessary to excise the rib, and it is wise to suture the incision. The drainage tube or tubes, if employed, should be as large as possible, but should not be too long inside the chest. As a rule a double-barrel tube is best, and excellent results will be obtained from irrigating the cavity with Dakin's solution; in other words, neutral solution of chlorinated soda 0.5 per cent. In the experience of this Commission dichloramine-T gave no better results than Dakin's solution.

THE TREATMENT OF UNUNITED FRACTURES.

On this ever-present injury, examples of which are probably more numerous now than they ever have been in the history of the world, and let us hope than they ever will be again, Groves (*British Journal of Surgery*, October, 1918) contributes a paper of great value based on personal experience dealing particularly with a series of 60 consecutive cases. The obvious causes for non-union are primary loss of substance, comprising 34 of his 60 cases; necrosis and secondary loss of substance, 3 cases; displacement with infection of the soft parts, 21 cases; and eburnation or sclerosis, 2 cases. Whatever may be one's conception as to osteogenesis, it is obvious that in the adult a gap in one of the long bones remains unfilled by new bone in a large number of cases. Neither the periosteum nor the cutting ends of the injured bones

produce any appreciable callous repair, nor does there seem to be the slightest evidence of reconstruction of the diaphysis in the adult bone when a considerable portion of it has been removed. In some of these cases it was obvious that the bone had been very freely sacrificed by attack, as shown by the clean, sawn ends. Doubtless rapid, clean healing has often been promoted thereby, and limbs or even lives have been saved that otherwise would have been lost by more conservative methods; but it should be borne in mind that resection of bone does almost inevitably lead to ununited fracture which causes loss of function and requires difficult and uncertain operative treatment for its final restitution.

In addition to the 60 cases studied Groves has seen a large number of fractures the union of which was delayed by sequestra and in which rapid union took place after the removal of the dead bone. This leads to the conclusion that whilst primary removal of all loose fragments is likely to cause ununited fracture, if the case is freely drained and properly immobilized and left until the dead bone is properly differentiated from the living before the removal of the sequestra, natural union will generally occur. Indeed, the cases of comminution heal with greater rapidity than those of a more simple nature. Always supposing that free drainage has been secured with the removal of gross dirt and septic parts of objects, the leaving of bone fragments in the comminuted fracture is the shortest way of securing rapid and natural repair; removal of these fragments is the surest way of producing an ununited fracture. If the fragment be absolutely loose and with no soft parts of any kind, it is obvious that it should be removed from the septic wound. In four to six weeks the *x*-ray affords a ready and certain method of distinguishing between dead and living bone. All the living bone becomes rarefied, whilst the dead bone retains its original opacity.

The radius, ulna and humerus are the three bones which oftenest exhibit loss of substance. In the case of the former two, when one of them is intact, the explanation is that contraction cannot take place. With the humerus it is the weight of the arm which prevents contraction, and it is not easy to devise a suitable splint which will obviate this whilst allowing for a daily dressing. The tibia is not so frequently the seat of an ununited fracture from loss of substance because usually the fibula is broken either primarily or secondarily, and this allows for the apposition of the broken surfaces. In case of a small gap in the tibia with a large anterior wound which will make grafting difficult, it is well to do an osteotomy of the fibula at an early stage so as to get the tibia fragments together before sclerosis has occurred. The femur is rarely the seat of ununited fracture due to a loss of substance, because the strong contraction of the thigh muscles brings the bone ends together. If the loss is not more than 1½ inches, and if care be taken to secure correct alignment, this natural mode of cure should be encouraged.

Necrosis is a common cause of delayed union, but a rare one for non-union. The line of treatment to be adopted in these cases is first removal of dead bone and granulation tissue, postponing any reconstruction operation until six months after healing has occurred, by which time nearly all of such cases will have undergone spontaneous union. Necrosis very seldom affects the ends of the main fracture. Non-union of fragments of fracture results from displacement for the same reason that it does from loss of substance. In each case the bone surfaces are removed too far from one another for the callus to bridge between them. The most frequent form is overlapping, in which broad contact between the fragments is retained, and it is usually followed by union, even if there is shortening; but if there is marked angulation, then the bone fragments become separated by the intervention of soft tissues and callus bridging is prevented.

In Groves's cases unusual displacement was most conspicuous in fracture of the femur. In many cases displacement was due to the limb not having been correctly immobilized in the first place. It should

be placed in the natural position of muscular relaxation—*i.e.*, with the hip and knee semiflexed and the thigh abducted. In this way can the main fragment best be brought into line with the upper piece. It is tilted forward and outward over the lower piece, which is tilted backward. If in this position efficient pin extension be adopted, full length as well as alignment will be attained. A displacement of the shaft of the radius in which the distal fragment is pulled inward and is liable to be attached to the ulna is a fairly common type. This condition usually requires a reconstructive operation.

As to eburnation as a cause of non-union, this is probably due to a feeble circulation in bones where there is a constant muscular strain, and often follows a plating which holds the bones apart rather than bringing them in direct contact. Groves believes that neither sepsis nor mobility should be ranked among the causes of non-union of fractures, though it may at times be attributed to either of these causes or both. Indeed, he holds that mobility, provided it does not dislocate the ends of bones in contact with one another, actually encourages rapid union. In this relation Groves calls attention to the circumstance that if the excision of an ankylosed joint is performed ultimate mobility, that is non-union, will be best secured by absolute rest for several weeks followed by only the gentlest of movements. On the other hand, if anything like forcible movements be undertaken at an early stage, then reankylosis will probably occur.

As to the natural course of ununited fractures, if the ends of the bones are separated by a considerable distance either from loss of substance or by displacement, it is almost certain that union will never occur; this for two reasons: first, that new bone is not laid down in adult tissue except as a thin layer covering the bone wounds; and second, that these wounded bone surfaces soon become wrapped round in a dense avascular connective-tissue envelope which seals up the little osteogenic impulse which first existed. It must be admitted, however, that it is extremely difficult to be certain about the behavior of the bone in any given case, so that it is always wise to wait for a long time before deciding that union is not going to occur by natural means. During this waiting period the various well-known methods of stimulating osteogenesis may be tried. These are—in their order of usefulness—movement, passive congestion, percussion, and injection of various fluids.

There are three methods used for the fixation of the graft: the first of these methods will almost invariably succeed in producing union in all cases in which there is actual bone contact between the main fragments, supposing that their application has not been too long delayed. They are quite useless, however, in regard to osteogenesis when there is a large gap between the bone ends, though they do something to preserve vascularity and function.

In all doubtful cases—*i.e.*, where the separation of the bone fragments is definite but small—decision between expectant and operative treatment must depend upon the amount of deformity which will result from the former, and the prospect of correcting it by the latter. So long as infection or its results have to be got rid of, and there is definite evidence of recovery of continuity by the bone and of function by the muscles, then the time of waiting is all a gain. On the other hand, if there is no continuity restored in the bone, and this applies especially to single bones, *e.g.*, the humerus or the femur, then prolonged waiting does definite harm. This is due to two circumstances: First, the bone itself undergoes changes which are prejudicial to a reconstructive operation; the fragments always suffer from atrophy or sclerosis, and in each case this involves a diminution both of vascular supply and of bone-forming cells. Secondly, the soft tissues all suffer from the loss of their normal skeletal support; the muscles waste and lose their function, and the nerves are often so dragged upon as to be incapable of conduction.

Passive congestion is a method of the greatest possible value in expediting the

healing of a fracture. It may be applied in two ways: either by tying a piece of drainage tube above and below the seat of fracture (Thomas); or by the use of a flat rubber bandage applied above the injured portion of the limb (Bier). Each method has its own advantages. Thomas's method produces a more local congestion, but in the forearm and below the knee it has the drawback of tending to displace the parallel bones toward one another. Bier's method produces a more massive congestion, but requires more skill and judgment in its application. It is especially suitable for the forearm or leg bones, and for any case with extensive wounds.

Another method which acts by encouraging local congestion is the application of a light plaster-of-Paris bandage, provided with a window opposite the wound. This should be applied with the limb raised, and when it has set the limb is lowered and used. Local edema of the parts at the window is produced, with a temporary increase of discharge. The limb can be used, and this promotes the circulation and also some frictional stimulation of the bone ends.

Deep and percussion massage should be used in all cases in which mobility at the seat of fracture persists unduly. The presence of pain during manipulation is a useful guide in this matter. In the early stages of normal fracture recovery, any attempt to move the bone is accompanied by pain, and such should be most carefully avoided. Later on, however, if the fracture has assumed an indolent condition, manipulation is painless; and this is an indication that deep massage, and even friction of the bone ends together, should be carried out.

The rôle of movements in the treatment of fractures has been emphasized quite rightly by Lucas-Championnière. But movements must be regulated by two conditions: they must be painless, and must not tend to displace the fragments from one another or to alter the alignment of the bone. Passive and active movements, most carefully adjusted for each case, should be carried out as soon as these can be done without causing pain or moving the fragments. Then, when a fair degree of consolidation has occurred, a suitable case splint is applied and functional movements encouraged. The great danger of early mobilization of fractures lies in the liability to the bending of soft callus union, and this must be recognized and prevented by suitable splinting or posture.

There are four situations in which this danger should always be guarded against: In the upper end of the humerus the bone becomes angulated outward, and this can be prevented by keeping the arm in an abduction frame. In the radius there is always a tendency to pronation, which must be prevented by a supination splint taking its bearing above the elbow-joint. At the upper end of the femur there is a tendency to angulation outward, and this often persists in gunshot fractures for twelve months after the original injury. It must be fully corrected in the first place by efficient extension in a position of flexion and abduction of the thigh, and then maintained by some form of rigid metal splint on the outer side of the leg, which is firmly fixed above to the pelvis and below to the condyles of the femur. There is a tendency to a backward sagging of the middle of the femur in fractures of the shaft of that bone. This, again, must be first corrected by suitable cradling combined with extension, and then maintained by a light case splint suitably supported to the opposite shoulder. A rule of safety is to use a walking caliper splint for all gunshot fractures of the femur for six months after union has taken place.

There have been many proposals to attempt callus stimulation without bone suture. They consist in needling the bone ends, injection of blood or of fibrin, the insertion of magnesium, or the drilling of the fragments. No doubt all these have a certain value, but from a practical standpoint in dealing with really ununited fractures they are unsatisfactory. Based upon experimental evidence they are liable to fail, for the conditions of an ununited fracture are different from those which obtain in experimental conditions; that is to say, there exists a sclerosis both of the

bone and soft parts in ununited fractures which is not present in animal experiments. Clinically, therefore, these methods either do too much or too little; they are superfluous or they are futile. If sclerosis of the tissues is not present, then the methods of congestion, deep massage, and limited movement will suffice; if it does exist, and if an open operation is necessary, then something more certainly efficacious is indicated. Multiple drilling of the bone fragments after removal of the scar tissue is certainly the best of these callus-stimulating devices; but it will only succeed where there has been no loss of bone substance and no gap to be filled.

In every case of ununited fracture there is one of three principal causative factors—either a gap in the bone, an interposition of soft parts, or an indolence of the bone ends. The last-named factor is one of great importance, because it arises in every case sooner or later, whether it is a primary condition or not. It may actually arise from the other two conditions, namely, want of continuity or the interposition of soft parts, or it may be caused by septic inflammation, which brings about a filling up of the vascular canals of the bone and a covering of its surface with scar tissue. Indolence of the ends of a fractured bone may take the form either of atrophy or sclerosis. Atrophy is most conspicuous when there is a gap in the continuity of the bone, sclerosis when there has been marked septic inflammation. But in either case the condition of the bone ends with which it is desired to bring about union is very unsatisfactory. Either there is a shaft of a bone which consists of a mere thin shell filled with fatty marrow, or else there is a dense avascular substance which is best described as bone scar tissue. Such bones will not throw out callus in the normal way however they are treated, and all the non-operative methods of treatment are therefore likely to fail. Similarly, other methods which merely aim at suture of the bone, without providing for the removal and replacement of this unhealthy tissue, will also fail, and this must be one of the cardinal facts to be borne in mind in the consideration of all operative procedures.

Whatever may be the possibility of sterilizing wounds of the soft parts and of the bones in the early stages of their existence, this possibility has vanished at a late period. From this it follows that the most important problem of military surgery still consists in an early and thorough treatment of the wounds so as to allow of primary or delayed primary suture; and that, if this has not been done, a very long interval must be allowed to elapse before reconstructive operations are undertaken, in order that natural processes of reaction against infective organisms may be complete. We have long been familiar with the idea of latent infection, particularly in the case of tuberculosis. We knew that the so-called cure of a tuberculous disease was often only a comparative term, and that any violent trauma such as that entailed by wrenching a tuberculous joint would almost certainly lead to a violent recrudescence of the infective disease. Just so it is with limbs which have for weeks or months been subject to pyogenic infection. In proportion, probably, to the length of time that infection is known to have existed will be the period necessary for the infective agent to be eliminated, even after the outward signs of infection—*i.e.*, inflammation or an unhealed sinus—have disappeared. The probability of latent infection and the length of its duration in any given case is in proportion to the extent of the primary wound and its degree of infection; the amount of scar tissue deposited in the tissues; the length of time during which manifest infection is known to have been present; the extent of bone involvement. This latent infection will be slight and transient in a clean through-and-through wound which has quickly healed, and it will be great and of long duration in an open lacerated wound which has slowly healed with a deposit of much scar tissue; and of all wounds, those which have opened up and comminuted with large tracts of bone tissue will be those which harbor latent sepsis the longest.

It has been generally accepted that a period of three months should elapse between the healing of a septic wound and the undertaking of any reconstructive operation. This may be a good working rule, but should be regarded as a minimum, to be increased when there has been a large wound, much scar tissue, and much bone involvement.

Second only in importance to autogenous infection by latent sepsis as a cause of failure is the presence of large masses of scar tissue on the surface and in the depths of the wound. Probably the infective agents become encapsulated in the scar tissue, just as happens in the healed tuberculous foci of a phthisical lung. Not only is scar tissue resulting from a septic wound to be regarded as a germ envelope, but also it is a tissue of very low resistance to extraneous infection. The most striking evidence of this is afforded by the behavior of cutaneous scars after operations. The wound heals by first intention, but if a large skin scar has been left to cover the tissues, then, within a few days, this gives way in part, or altogether melts away, leaving a superficial ulcer. But after all the skin is only the visible aspect of the scar, and the deep scar in the soft tissues and the bone —whether at the ends of the main fragments or as isolated pieces—must also be regarded as tissue of poor vitality, deficient circulation, and weak resistance. The ideal principle to be arrived at is to remove all this scar tissue before attempting to reconstruct the bone. In practice it is usually the best plan to do one or more preliminary operations for the substitution of the skin cicatrix and the soft tissue scars. It is best in the case of a large skin wound to take a pedicled flap from the chest (in case of the arm) or from the opposite leg (in case of the lower member), and to cut the pedicle in from seven to ten days. The deep scar is removed at the same time, as far as possible in one mass, the surrounding muscles being then brought together to obliterate the dead space. This secures a thick, fatty skin-covering for the site of the future bone operation. It is better to leave the removal of bone scar—*i.e.*, the ends of the main fragments—until the actual reconstructive operation is to be performed; but loose bits of bone should be taken out with the fibrous scar tissue in the preliminary operation, on the two grounds that they are often the seat of latent infection, and that, being quite indolent and avascular themselves, they only tend to prevent vascularization and bone growth at the site of the reconstructed bone.

It happens only too often that, after a long period of waiting for sinuses to heal and for latent sepsis to disappear, the general nutrition of the limb has suffered and the muscles atrophied to such an extent that a very poor prospect is offered for bone repair. Under such circumstances it is very doubtful whether it is justifiable to operate, and the question arises whether nutrition and function can be restored before repairing the bone. Two kinds of treatment must be patiently pursued. On the one hand, the nutrition must be maintained and adhesions of the tendons and joints prevented by massage and electrical stimulation; on the other, an apparatus must be provided which enables functional exercise of the muscles to be undertaken, whilst preventing deformity. In principle, such apparatus consists in making a light splint casing for the limb, with joints at the natural articulations; being in reality the provision of a temporary exo-skeleton in place of the missing endo-skeleton. When the muscles have recovered sufficient strength under this treatment to move the limb, and when the blue, cold member has become warm and of a natural color, then the bone repair may be done with good prospect of success.

There are two procedures commonly recommended for bone surgery which appear to have no sufficient justification, but to be open to grave drawbacks. One of these is the dependence on forcipressure alone for hemostasis. It is far better to ligate every bleeding point with fine catgut, for there is nothing more prejudicial to healing than the formation of a hematoma. The other is the dictum that the gloved fingers should not be put into the wound.

If the hands are clothed with rubber and cotton gloves, Groves sees no reason to doubt the sterility of these any more than that of the instruments or swabs. Moreover, complicated joinery cannot be well done without the help of the fingers. Accurate fitting and firm fixation are the two watchwords of operative bone repair, and for these fingers are necessary.

The freshly united bone must be kept without disturbing strain until firm union has occurred. About this there can be no doubt; the only question which has to be considered is how this immobility is best secured in such a way as to interfere as little as possible with the circulation of the part and attention to the wound. If the bone repair has been done in a solid manner, then the actual fixation will be secured by this. On the other hand, if the parts, whether bone ends or bone grafts, have only been tied with soft ligatures, then reliance must be placed upon plaster-of-Paris dressings. The application of these two methods of fixation will become apparent when the special operations have been considered.

Naked grafts form new bone very slowly and scantily; periosteal flaps in adults form no new bone at all; bulky grafts covered by periosteum are capable of depositing thick new bone in the form of an involucrum. From these facts it may be inferred that the osteoblasts necessary for new bone formation are contained in the dense bone, but that the protecting and vascularizing matrix of the periosteum is necessary for their activity.

The best source of the graft has been much discussed, but for the repair of the long bones the crest of internal surface of the tibia holds most advantages. From this bone the greatest length and strength can be obtained with the minimum exposure or damage to soft parts. It is well provided with thick periosteum, and is readily accessible for accurate sawing. From the crest may be obtained a strong bone ¾ inch square in section, and from the surface a long thick plate 1½ inches wide and ⅜ inch thick. The only serious objection which can be urged against the use of the tibia is the fact that fracture sometimes occurs in it after the removal of a thick graft. This has happened in two cases, but in each it was only a small fissured fracture without displacement. The fibula has some points to recommend it. These are, that it presents a rod-shaped bone which requires no cutting, and that it is not an essential feature in the skeleton; but it is very variable in its shape and size, and it is difficult to clear it of muscle without stripping it of its periosteum. With a proper motor saw a good graft can be cut from the tibia much more quickly than from the fibula, in the case of a muscular leg.

In determining the size of the graft two points must be borne in mind: First, that no new bone of any mechanical importance can be expected to arise from it for many months, and that it must therefore be cut large enough to fill the gap it has to replace as far as possible. Secondly, that as the graft ought to have contact with a wide face of bone bed on each side, it must be cut of sufficient length to secure this. The ideal length is not less than three times that of the gap. For example, if there is a gap of two inches between the main fragments after their unhealthy ends have been cut off, then the graft ought to be six inches long.

A further vital condition to be considered is that relating to the contact between the graft and its bed. Rapid and sound union will depend upon broad and accurate contact efficiently maintained, and it must be a main object of the technique to secure such contact.

There are three methods used for the fixation of a graft: Suture by ordinary absorbable ligatures; fitting by accurate joinery; fixation by means of metal screws, pins, wires, or plates.

The first method, that of ordinary suture —*i.e.*, of the periosteum of the graft to that of its bed—is only suitable for situations where there is no tendency to movement or displacement, *e.g.*, in the repair of defects in the cranium; here, indeed, no sutures are really necessary. In the long bones, catgut or animal-tendon suture can-

not be regarded as a serious method of fixation except for the attachment of the periosteum. If any strain has to be borne by ligatures in the fixation of a graft, then choice would be of some metal suture—*e.g.*, a bolt or a pin; but failing such, it is better to use a piece of the patient's own fascia or tendon than to place any reliance upon catgut or animal tendons. In the leg, strands of the fascia lata, and in the arm a piece of palmaris longus tendon, are far better suture materials than pieces of sheep's intestine or kangaroo tail.

The method of fixation always to be aimed at is that of fitting the graft into a slot or cavity in the bed in such a way as to require no suture at all. When this can be well done the method never fails, provided latent sepsis has been eliminated and scar tissue removed. The simplest type of this fixation is seen in the use of a square tibial peg driven into the cancellous tissue of the femoral neck for fracture of that bone. In the same way the living intramedullary peg can be used as a graft for the repair of fractures in certain situations, viz., the upper or proximal third of the femur or ulna. That is to say, in both these situations a peg can be firmly driven into the shaft of the bone so that graft and bed are firmly contacted in the whole length of the former. It must be carefully noted that this is a very different procedure from putting a living intramedullary peg into the site of a fracture, introducing it into one broken end and then bringing the other over it (as in the use of short pegs described above). This latter procedure is by clinical and experimental evidence likely to fail, because the peg is so short and the fitting so loose. In the firmly fitted the peg should not be round but angular in section. For example, in the femur the shaft is hollowed by a ⅜-inch drill, which leaves a margin of at least ⅛ inch of fairly soft bone all round the cavity. A square peg is cut from the tibia, 6 inches long and ⅝ inch thick, and then filed down so as to pass through a ½-inch hole. It then has a roughly octagonal section, and can be hammered into the ⅜-inch hole so as to hold very firmly, and 3 inches will lie on each side of the line of fracture.

There are two other methods by which a graft can be firmly fitted as an intramedullary peg, and these are specially suited for cases in which there has been a loss of substance. Suppose that the gap to be filled is 2 inches after removal of unhealthy bone from the ends of the fragments; suppose that it is the radius to be repaired, having an outside diameter of half an inch and an inside cavity of a quarter of an inch. The graft is cut square and of 6 inches length. Each end is shaped with a file for 2 inches, until it fits tightly the holes drilled in the fragments. Into one fragment the graft is driven (temporarily wrapping the bone round with several turns of wire to prevent splitting). The other fragment is cut for 2½ inches with a fret-saw, and the two halves are pried apart so as to take the spindle at the other end of the graft. Then this split end and the contained graft are sutured through two holes by suture or split-pins. In the alternative method, which is to be used if one fragment of the bed cannot be split as above described, the graft, having been shaped so as to fit at each end, is itself cut into two portions by a Z-shaped incision. Each half is hammered into place, and then the graft fitted together and sutured or pinned.

The inlay cortical graft, which has been used and popularized by Albee, is a superficial graft, laid down in a slot cut for it in the cortex of the bone to be mended. The use of wire nails, screws, bolts, or plates as a method of fixation must be considered. And in this connection it is wise to hold a temperate and reasoned opinion which avoids impracticable extremes. The fact that wire, plates, and screws have often been unwisely used and caused trouble is not sufficient reason to reject metallic suture when this will afford definite advantages. That there is nothing essentially hostile to a graft in the presence of metal sutures is proved by the many cases in which success has followed this method of fixation. In 13 out of 19 successful cases in the present series metal sutures were

used. If it is admitted on the one hand that firm fitting without metal sutures is always the ideal method of grafting, it must be granted that firm fixation by metal sutures is better than insecure fixation without.

Another point to be borne in mind is that the use of firm metal fixation will greatly simplify after-treatment, inasmuch as much less plaster-of-Paris immobilization is then required. In the forearm bones, for example, the limb is kept on a simple splint for a few days until the smooth healing of the wound is secured; then plaster is applied for two or three weeks; and after this the man is set to light work without any splint or plaster of any kind; and in this way much more rapid restoration of function is obtained than by keeping the limb for months in plaster.

As to the results obtained in bone grafting in Groves's series of cases there were 34 cases of autogenous bone grafts; of these 10 failed, 5 were eventually successful after extrusion of the graft, and 19 were completely successful.

THE CURSE OF IMMOBILIZATION.

In an article with the above heading, appearing in the *British Medical Journal* of November 23, 1918, contributed by Dowden, he states on the basis of four years' experience of war surgery, embracing much injury to joints, as one of the great lessons he has learned during his war career, that following trauma and immediately thereafter treatment by active movements should be carried out, steadily increasing the range. He thus becomes an active champion of Lucas-Championnière's crusade begun many years ago against the universal habit of prolonged fixation after bone injury. To any one who has studied the *x*-ray pictures of bones after prolonged rest, and this is particularly true of those of the lower extremity, since the rest of recumbency throws them more out of function than it does those of the upper extremity, the pronounced osteoporosis resulting from this rest is perfectly obvious; perhaps most pronounced at the epiphyseal line, and this even in the case of those at or past middle age; a rarefaction so distinct that if, for instance, the femur of the patient uninjured in the lower extremity, put to bed, kept there and unexercised, were taken at the beginning of his confinement and again taken at the expiration of several weeks, a person with no previous experience in interpreting *x*-rays would readily note the difference in density. This is due to the circumstance that growth and nutrition are absolutely dependent upon blood, that the blood must be in its vessels and must be circulating freely to produce its effect; that the contraction of muscles is practically emptying the veins toward the center, and that when these repeated contractions are no longer called into play there is a slowing of blood circulation and lessened vitality, and all nutritional changes take place with a lowered efficiency. What is true of the bones also obtains in regard to the muscles. Indeed, rest over night will on careful measurement be shown to distinctly lessen the girth of the calf, and rest for a single week in bed produces an atrophy shocking and mortifying to him who suffers from it.

Therefore the reason for motion in so far as the nutrition of the part is concerned is obvious. By motion circulation is bettered and all the reparative processes are hastened. Voluntary motion is also much more potent in accomplishing this end than passive motion. The difficulty lies in the proper adjustment after the first few days spent in removal of the blood-clot which is entirely useless; the reparative processes begin in earnest with the formation of granular tissue, which becomes vascularized. Any motion which breaks up this vascularization produces further blood-clot, which must be removed and retards healing. Therefore the rule should be the freest motion possible compatible with the preservation of the circulation of the newly formed tissues.

The best gauge as to the quantity of motion allowable is probably the sensation of the patient. If motion, both active and pas-

sive, produces no obvious deformity and is not followed by increased discomfort, or actual pain lasting more than a few minutes, it is probable that it is entirely advantageous. Motions, however, which are followed by a continued pain, by swelling and heat of the part, usually do more harm than good, postpone healing, and encourage an ultimate deformity and limitation of motion. For which reason the employment of the so-called skilled masseurs is sometimes unfortunate. Filled with an enthusiasm for their calling and with a wish to accomplish results which will delight the patient and astonish the surgeon, they throw into their work a vigor and enthusiasm which is often entirely hurtful.

A further advantage of motion is incident to the fact that thus, and thus only, can the movements of the joints, the play of the tendons, and the suppleness of the muscles be preserved. A fixed position with a perfectly healthy limb if continued for weeks leads to a shrinkage of the joint capsule and all the muscular parts in correspondence with this position and requires weeks, months, years, or occasionally more than a lifetime to overcome, this particularly in the case of people at or past middle life. This form of fixation is nearly always entirely avoidable and is due to a settled belief upon the part of the profession at large that all cases of fracture must be treated by absolute immobilization for at least five weeks, which the experience of this war will do much to change.

REPORTS ON THERAPEUTIC PROGRESS.

INFLUENZA.

POWELL, in the *Practitioner* for January, 1919, states that he has nothing personally to add to his remarks included, with many other articles, in the Special Influenza Number of the *Practitioner* of January, 1907. He does not see that we can get much further in our clinical knowledge of the disease until at least a more exact pathological knowledge, both with regard to influenza itself and its varied phases and manifestations, obtains. It is indeed a multifarious disease.

The catarrhal form of influenza, as affecting the lungs, is attended with physical signs which are absolutely characteristic of the disease, viz., the explosive inspiratory crepitus scattered through the lungs, especially the posterior lobes, often wandering from one part of the lung to another unattended with percussion dulness; associated with a straining paroxysmal cough at first with little and very difficult expectoration, which in a few days becomes very profuse, glutinous, then purulent.

Many weeks before the recognition of influenza in the epidemic of 1890, he saw sporadic cases in which, with cough and fever, these peculiar physical signs were present, which he thought must be occasioned by a kind of inflammatory edema around scattered miliary tubercles, but they all got well. He had never seen anything like these cases before, but in the great epidemic which followed they were common enough. Of course, with pneumococcal infection superadded, the bronchopulmonary catarrhal signs are merged in those of an ordinary pneumonia, which differs from simple pneumonia in the increased tendency to paralytic filling of the lungs and cardiac failure. He says that the cases of pneumonia in influenza are always due to pneumococcal complications, if he may judge from several consecutive cases in which the pneumococcus was invariably found.

In the middle years of the epidemic, more than at first and latterly, he used to see cases in which toward the decline of the attack acute anginal heart seizures occurred. There was no cardiac lesion, there had not necessarily been during the attack any special strain upon the heart, the seizures were severe anginal cramps of the heart at-

tended with small thready pulse, which occurred in quite young as well as in older people. He cannot recall any cases of this type that were actually fatal, and, although threatening enough, he felt able to give a good prognosis with some reserve with regard to the older people.

There is one point with regard to these cases which he has not seen alluded to, and which, although not special to them, he thinks accounted for the anginal phenomena by way of increasing arterial tension, viz., that the urine toward the close of the acute attack of so far uncomplicated influenza in these cases particularly was of high specific gravity, and with such an excess of urea as to become solid with deposition of scaly nitrate crystals on the addition of nitric acid.

Of nerve phenomena, besides the intense headache, severe depression (sometimes with mental aberration resembling that which may follow enteric fever, but more remarkable as a sequel to so short an illness as influenza), and sleeplessness, he, like others, has seen a few cases of paralysis, paraplegia, and, in one case, affecting all of the limbs, of apparently the same type as diphtheritic paralysis, only not involving the fauces. He has seen one case of fatal neuritis attended with intense hyperesthesia, which he believed to be influenzal, and he has heard of a fatal case in which the diaphragm became involved.

The prevalence of neuritis, since the beginning of the 1890 epidemic, is within the experience of most of us. A remarkable neurosis is evinced in the occasional occurrence of true spasmodic asthma, as a sequel to influenza, in middle-aged people, with no predisposition, and who have never before suffered from that malady. Many such cases have come under his notice. The majority of these recover, and they are cases in which balneotherapeutics are valuable, but he has seen some very prolonged cases running the usual intermittent course of asthma. He is inclined to class these cases with those of spurious angina, to which he has alluded. It is clear that they are not dependent upon any coarse lesion of the nerve centers; they certainly are met with in persons of gouty diathesis.

INFLUENZA AS IT AFFECTS AIR-PASSAGES.

THOMSON, in the *Practitioner* for January, 1919, states that the general treatment is of primary importance in the inflammatory infections. He doubts not that many cases of acute sinusitis drift into chronic empyemata through neglect; while all the cases which he has seen treated from the beginning have cleared up. The patient should remain in bed until the acute stage is past; he can be kept very warm, but with his bedroom windows widely open. Tenderness or neuralgia is met by having the head wrapped up in a woolen shawl; hot fomentations are applied over the affected side, or the patient may lie with his face on a rubber hot-water bottle. If the maxillary sinus is affected, and there are any suspicious bicuspid or molar teeth on the same side, they should be removed. The pain can be met with phenacetine, caffeine, aspirin, or similar drugs, but when severe there need be no hesitation in giving hypodermic injections of morphine. As regards local measures, it is well to avoid carefully the use of sprays or lotions during the acute stage. They are apt to disseminate the infection, and there is the risk of their carrying it to the ear. The routine use of a saline or alkaline nose lotion is uncalled for. It is better to prescribe the following:

> Menthol, ½ drachm;
> Tincture of eucalyptus, 3 ounces.

A teaspoonful of this is put in a pint jug of steaming water, and the vapor is inhaled up the nose every two or three hours. It generally relieves pain, it frequently stimulates a free discharge, and patients are satisfied that it "clears the head." In view of cases, in which he has tried it, and the results published by Logan Turner (*Edinburgh Medical Journal,* August, 1906), he thinks relief can be safely obtained by puncturing the suppurating antrum from

the nose and washing it out with a tepid sterile saline solution. Relief to the frontal and sphenoidal sinuses may be secured by packing the neighborhood of the middle meatus, for a few minutes every day, with a pledget soaked in cocaine (5 per cent) and adrenalin. Experience shows that these sinus suppurations are more apt to occur on the side of the nose which is the more obstructed (by deviations, spurs, etc.); if the middle turbinal is very crowded, and evidently acting as an obstruction to the vent of discharge, its anterior portion can be removed. When the acute stage is past, a simple alkaline nose lotion may be employed. As the above cases have shown, there is no need to despair of ultimate resolution till change of air, rest, hygiene, and tonic treatment have raised the resistance of the patient. The inflammatory troubles of the pharynx and larynx are treated on ordinary principles.

CARDIAC COMPLICATIONS OF INFLUENZA.

MACKENZIE, in the *Practitioner* for January, 1919, deals at some length with the diagnosis of these cases, because he believes if we recognize the nature of the illness, then we can readily see on what principles treatment should be based. If the patient is the host of some microbe, the treatment should be devoted to increasing his power of resistance. If he is poisoned, treatment should be devoted to the elimination of the poison. Should certain tissues be injured by the invading microbe, or by the toxin or by physical strain, then treatment should be devoted to their healthy renewal.

These indications are practically those which should guide us in treating individuals after any exhausting illness. We have, however, in addition, to consider the mental condition, especially if some heart trouble is imagined. This knowledge always tends to depress, and to make the patients willing to follow that form of treatment which is the worst for them—rest in bed or the avoidance of exertion. If we recognize that such cardiac phenomena as murmurs, increase in size, and variability of rate are but the expressions of an irritated heart, we shall see that too much rest is not beneficial. Every organ benefits by the judicious exercise of its functions, and the heart can also be beneficially stimulated.

The principles of treatment, then, should be devoted to increasing the health of the body as a whole in such a way as to increase the natural resistance to infection, to eliminate toxic influences, and brace up the whole man bodily and mentally. The best way to achieve this is by fresh air and judicious exercise in the fresh air. He does not press the fresh air idea, for it is evident to all, but he does emphasize the question of exercise.

There is a notion, deeply rooted, that if there is anything wrong with the heart, the patient must be restricted in the amount of effort; medical men, who are themselves afflicted, are quite content to lie in bed or move gingerly about.

The line he has adopted is to reassure patients. They often feel miserable, so that there is a mental side to the case, which is aggravated by the supposition that there is something amiss with the heart. This aspect of the case has to be met, and consequently in our treatment this view has to be kept in mind.

When all fever has subsided, he encourages the patient to get up and go about quietly, leaving it to the patient to stop any exertion that produces fatigue. As he improves, he finds out the form of outdoor exercise which gives most pleasure, and recommends him to start on it as soon as possible.

In recommending such exercise he has two objects in view. The first is the mental condition of the patient, and he need not insist upon the beneficial effects of occupation. The more interesting the occupation the more likely is the patient to be taken out of himself. He refers to the fact that the sense of exhaustion is the predominant symptom in these cases, and that it is probably vasomotor in origin, due to the irrita-

tion of the central nervous system. We know that the mental state may play a part in producing exhaustion, for we find that a boring form of exercise will readily produce it, while a form of exercise that is full of interest can be borne for long periods without any exhaustion. Therefore, this out-of-door occupation should be in an attractive form.

In recommending effort, he knows that it will be said that there is danger in this, particularly when such physical signs as murmurs and dilatation are present. If the true nature of these signs is recognized—that they are but the expression of a temporary enfeeblement of the heart muscle, and that the same measure for restoring a flabby leg muscle applies to a flabby heart muscle—we shall see the importance of exercise, judiciously employed. No doubt injudicious exercise may do harm, but there is one precaution of a very simple kind which suffices to prevent any danger, and that is to instruct the patient to indulge only in an exercise so long as it gives pleasure and causes no distress or discomfort, and to stop or slow down as soon as the sense of exhaustion, breathlessness, or pain is experienced.

This simple and easily comprehended dictum contains in it the whole philosophy of the therapeutics of exercise as applied to the heart, and may be used with safety in all obscure and doubtful conditions of heart-weakness.

INFLUENZA FROM A CLINICAL STANDPOINT.

Moore, in the *Practitioner* for January, 1919, states that when a person is struck by influenza, only one course lies open, and that is to take to bed with the least possible delay. Rest, warmth, and quiet are three sovereign remedies for the primary disease and the best preventives of its secondary complications.

Probably the most popular remedy is ammoniated tincture of quinine. Its disagreeable taste is palliated by the addition to each drachm of the same quantity of syrup of orange peel. A dessertspoonful of this combination, equivalent to one grain of quinine, should be taken in water every fourth, sixth, or eighth hour. Quinine hydrochloride combined with liquor strychnine and dilute hydrobromic acid is an admirable tonic; or the non-official salicylate of quinine may be given with advantage.

To relieve the distressing rheumatoid or neuralgic pains of influenza, salicylate of sodium may be given in combination with granular effervescent citrate of caffeine. Of late Moore has prescribed salicin, disguising its bitter taste with liquid extract of licorice, which acts as a demulcent as well as a corrective; but the most useful combinations for this purpose are phenazone (3 to 5 grains for a dose), tincture of gelsemium (5 minims), and chloroform water (½ ounce); or acetanilide (7 grains), caffeine (1 grain), and sodium bicarbonate (2 grains), in a cachet. Either of these prescriptions may be repeated every two or three hours till pain subsides. Phenazone, even in small doses, is unsuitable for children; for them, phenacetine is safer as a sedative and analgesic. Be it remembered that these remedies should be given to relieve pain, not pushed so as to reduce bodily temperature, which is a practice fraught with danger to the patient's life.

In "heart failure"—to use a popular phrase—and in the tedious convalescence which so often follows in influenza, strychnine is our sheet-anchor. In failing heart, it is best given hypodermically to the amount of grain 1/30 in combination with digitalin (gr. 1/100) or with morphine, if the patient is restless or sleepless. Caffeine, strophanthus, and "camphor elixir" are also useful remedies when the heart flags.

Hypodermic injections of oily solutions of camphor have been extensively used in the present epidemic. The favorite formula is that mentioned in Martindale's Extra Pharmacopœia, namely, powdered camphor, 2 grains; ether, 3 minims; and olive (or almond) oil, to 10 minims. This was repeated every four hours.

It was difficult to induce sleep in the de-

lirious cases. Hyoscine hydrobromide (gr. 1/100) was cautiously used in some instances, and with success. Methyl-sulphonal or "trional" also played an important and valuable part.

The vaccine therapy of the disease was very fully discussed at a largely attended and very animated meeting of the Section of Medicine of the Royal Academy of Medicine in Ireland, on November 15. The prevailing opinion was that it was still in the experimental stage, that it was certainly more useful in prophylaxis than in curative treatment; and that in the latter it was useful in proportion to its early adoption, at a stage when the secondary infections had not complicated the disease. When this accident had happened, a mixed, or polyvalent, vaccine was preferred to one of the influenzal bacillus alone. The prophylactic dose now usually given in Dublin represents 25,000,000 organisms. This is followed in a week's time by a double dose. Both bacteriologists and clinicians are fully alive to the risk of producing a negative phase, and so rendering a person more liable to catch the disease when an epidemic is on foot.

The physician's skill and tact will be tried to the utmost in arranging the diet of an influenza patient, especially in the case of one suffering from the gastric type of the malady; but let him not despair, for the trouble he takes will meet its reward.

A word of warning in conclusion. The prescribing of alcoholic stimulants in influenza demands more than ordinary circumspection. The mental state in this malady is so excitable, so unstable, so impressionable—in a word, so neurotic—that the seeds of intemperance may be sown by following the unthinking advice to take wine or spirits as a stay in weakness. Moore's conviction is that alcoholic stimulants are, generally, not only unnecessary but positively harmful in the treatment of influenza. If ordered at all, they should be given with, or in, food, and only for a limited time like any other powerful drug.

In the septic bronchopneumonia, so often met with of late, "turpentine punch" proved a valuable remedy. Ten drops of turpentine on a lump of sugar, added to a wineglassful of ordinary whisky-punch, was the form in which this antiseptic stimulant was exhibited.

INFLUENZA AS AFFECTING THE RESPIRATORY SYSTEM.

MACKENZIE, in the *Practitioner* for February, 1919, states that the respiratory complications of influenza always add to the seriousness of the malady and to the anxiety and responsibility of the doctor. Every effort should be made to avert them. In the mildest attack of influenza the patient should at once go to bed, and remain there until some days after the fever has subsided. In the event of respiratory complications the patient should, as a rule, be kept in bed until they have cleared away.

As we have no specific remedy, treatment has to be symptomatic. The cough is the first symptom of importance which demands our attention. The patient may be given barley water, linseed tea, toast and water, or warm milk to sip. Steam inhalations may be employed, such as the well-known vapor benzoini, or an inhalation of eucalyptus and menthol (menthol xx gr., tr. eucalypt. fol. ℥j to ℥j, to a pint of warm water). Small doses of heroin hydrochloride, 1/36th to 1/12th of a grain, may be given at intervals of one to two hours. When the cough is frequent, dry, and hacking, a sedative linctus may be tried like the following:

℞ Morphin. hydrochlorid., gr. ½;
Heroin. hydrochlorid., gr. ½;
Apomorphin. hydrochlorid., gr. ¼;
Acid. hydrochlor. dil., m. xx;
Syrup. limonis, f℥ss;
Aquæ chlorof., ad f℥ij.

Ft. linct. Sig.: 1 drachm occasionally.

When there is bronchitis a mixture such as the following is useful:

℞ Liq. ammon. acetatis, f℥jss;
Pot. citrat., gr. xv;
Vin. ipecac, m. x;
Aq., ad f℥j.

S.: Take 3 times a day.

An ammonia and nux vomica mixture with squill or senega may be given later if

secretion becomes profuse. When the secretion is thick, viscid, and expectorated with difficulty, preparations containing opium are contraindicated and should not be given.

Linseed or linseed and mustard poultices, applications of antiphlogistine, or turpentine stupes may be employed, when there is tightness of the chest, or soreness or pain on breathing.

The same remedies may be used in cases of bronchopneumonia, but in this complication, as well as in lobar pneumonia, the main indication is to keep a watch on the heart.

The chief danger in influenzal bronchopneumonia and pneumonia is cardiac failure. Every effort should be made to maintain the patient's strength. When there are signs of failing heart, stimulants are of special value. Of these the most important are alcohol, strychnine, caffeine, camphor, digitalis, and strophanthus. Alcohol is indicated when there is prostration, and specially in cases in which there is delirium and sleeplessness. Champagne and brandy are the best forms in which to administer it. The amounts to be given must be regulated by the age and condition of the patient, and by the effects on the heart and pulse in individual cases. The mistura spiritus vini gallici is an excellent combination of nourishment and stimulant.

Strychnine is of great value in failing heart, and should be administered hypodermically in doses of from 1/60th to 1/20th of a grain, being repeated as required at intervals of three or four hours. Caffeine is another cardiac stimulant in which Mackenzie has faith, and it also is best administered hypodermically in three- or four-grain doses.

Intramuscular injections of camphor dissolved in olive oil have come much into favor in England of recent years, but have long been advocated on the Continent as cardiac stimulants by Finkler and others. The ordinary dose is two to three grains of camphor dissolved in pure olive oil (1 to 10). It may be obtained ready for use in the form of ampoules. Camphor may also be given as a stimulant by the mouth, five drops of the spirit on sugar repeated from time to time. Huchard and other French physicians recommend five-minim doses of the 1-in-1000 solution of crystallized digitaline. Digitalis is a remedy which has long been advocated in the treatment of pneumonia, and no doubt it is of value, as Wilson Fox maintained, in cases in which from an early period there is undue frequency combined with weakness of the pulse, or when the expectoration is profuse and bloody, and in cases of alcoholism when there is profuse sweating; but it should be given early in these cases, and combined with alcoholic stimulation. Wilson Fox believed, however, that it was contraindicated and even dangerous in old people. Mackenzie specially mentions digitalis here, because he finds that some valuable old remedies are apt to be lost sight of at the present time.

Strophanthus is another valuable cardiac stimulant. The best form to employ is hypodermic or intravenous injections of strophanthin, dose 1/500 to 1/100 grain. The latter is the better when rapid effect is desired.

An old-fashioned remedy which Mackenzie has sometimes employed, he thinks, with advantage in cases of prostration in elderly subjects is musk. Five to ten grains may be given in a cachet, or it may be prescribed in the following form:

℞ Moschi, gr. iij;
Sp. menth. pip., m. xv;
Sp. ammon. aromat., m. xlv.
Ex. aquam. p. r. n.

Or, as Sir Dyce Duckworth advises, combined with Hoffmann's anodyne, as follows:

℞ Moschi, gr. v;
Sp. ætheris co., ℥ss;
Mucilaginis, f℥j;
Aq. aurant. flor., f℥j.
Ft. haust. p. r. n.

Sleeplessness is sometimes a prominent symptom and, when combined with delirium and prostration, a cause of great anxiety. Opium and morphine are usually contraindicated, on account of drying up the secretions and clogging the air-passages,

and great caution is needed if they are administered. Probably one of the best combinations to employ is chloral, but it is not so effective in producing sleep, and lately it has not been obtainable in England. Other hypnotics, such as paraldehyde, sulphonal, trional, dial, and veronal, may be employed, but Mackenzie has found them all uncertain in their action in the sleeplessness of pneumonia. Whatever hypnotic is employed, alcohol should also be administered.

Sponging, the application of cold compresses, or the wet pack, may be used in cases of sleeplessness or when the temperature is high.

Oxygen inhalations should be employed when there is dyspnea and cyanosis; the rate of the respirations and the color of the lips and extremities will be the best indications for their employment. They should be given for such times and at such intervals as the condition of the patient demands, but should not be given continuously unless the condition of the patient is desperate. During the present epidemic there has been great difficulty in obtaining a supply even for hospital cases. One has had, therefore, to be sparing of its use.

The diet should consist mainly of milk, beaten-up eggs, beef tea, chicken broth, rusks, Benger's food, calf's-foot jelly, etc. At the present time beef tea and chicken broth are likely to be almost unobtainable, and the diet may be supplemented by bovril, glaxo, Brand's essence, Valantine's meat juice, etc. Often there is an utter distaste for food. The mouth, the tongue, and the teeth should be kept as clean as possible. The action of the bowels should be carefully attended to.

The room in which the patient is nursed should, if possible, be large and airy, but he must be kept out of the way of draughts. If there is bronchitis, screens around the head of the bed and a bronchitis kettle are advisable. At this time of the year a fire should be kept up in the room day and night, but the room should not be allowed to get too hot. A temperature of about 62° F. is the best for the patient. With a fire in the room the window can be left open. Purity of the air of the sick-room is more important than even its temperature; but one must use common sense in these matters and avoid extremes in both directions.

The best prophylactic against influenza and its respiratory complications is fresh air. Nothing is more striking than the manner in which influenza spreads in stuffy and ill-ventilated hotels. Sir Dyce Duckworth has called attention to the risks of picking up influenza in trains. We are far in advance of our continental neighbors, friends and others, in our love of fresh air, but there are still far too many who regard an open window as a source of danger, and insist on closed windows in trains, hotels, and all places of public resort. Fresh air is the best disinfectant, but it must also be remembered that where there is dust or dirt there is danger. The interiors of houses, shops, offices, workshops, theaters, meeting halls, churches, and public conveyances must be kept clean as well as airy if they are to be safe and free from the germs of such a disease as influenza and its complications.

It has often been pointed out that influenza differs from other infectious fevers in the fact that one attack does not lead to immunity from others. Persons who have had one attack indeed seem to be rather more than less susceptible when exposed to infection. If the influenza bacillus is the cause of the malady, there would be no theoretical reason for expecting a vaccine prepared from it to confer any immunity of more than short duration; but on the supposition that the true virus is still undiscovered we may still be able by means of a vaccine to protect the body from the allies, which are several times more dangerous than the virus itself. A vaccine of this kind has been suggested by a committee of expert bacteriologists for tentative use in the army. Two prophylactic inoculations were recommended. The first was as follows: B. influenzæ, 30 millions; pneumococci, 100 millions; streptococci, 40 millions. After ten days a second was given

twice as large as the first. Exception was taken to this by more than one authority on the ground that the dosage of influenza bacillus was too small, and that to be effective a dose of 200 or 300 millions B. influenzæ should be employed. It was suggested that, in the treatment of chronic cases of secondary infection, doses of one-fifth the first dose might be employed. The use of a vaccine in severe secondary bronchopneumonias was not recommended, but one-twentieth of the first dose was suggested as a suitable one. Vaccine treatment must at the present time be considered as only on trial, and a matter of theory rather than of proved utility.

The treatment of pleurisy needs a word in conclusion. The pain of dry pleurisy may be relieved by local applications, such as belladonna liniment, fomentations, or dry heat. When there is effusion, the possibility of an empyema must be borne in mind, and, if found to be present, should be treated surgically.

SOME NOTES ON THE PRESENT "SPANISH" INFLUENZA EPIDEMIC.

In the *Boston Medical and Surgical Journal* of February 6, 1919, SAINTE-MARIE states that in most cases the coloration of the throat gave the note of the prognosis. It ran from the red violet to the rose in mild cases. The cure generally corresponded to the rose color. The persistence of the dark-red coloration of the first three days usually meant a severe case of disagreeable symptoms and thoracic complications.

A wash for the mouth, teeth or nose composed of thymol solution (saturated) mixed with one to three, four, five, or six parts of water gave good results if used with caution. The most effective curative and preventive that he used was camphorated oil taken internally, whether by mouth, by nose, on sugar, or in capsules, and in doses varying from 7 to 180 drops intramuscularly. The mouth-wash and the camphorated oil, used conjointly in five-drop doses and taken at four-hour intervals during the epidemic, prevented many from having influenza, he believes. Antiseptic treatment of the bowels was another measure practiced successfully.

Two cases of meningitis, together with pneumonia complications, unconsciousness, acidosis, and a degree of sensibility irritating quiescent nerves, were relieved by injection into the spinal canal of a solution of spirits of camphor diluted secundum artem to 1/20 of camphor and ½ strength of alcohol. These two cases were cured after 20 days' care at the hospital. [We question the wisdom of this.—ED.]

The 10-Cc. intramuscular injection of camphorated oil saved many who became cyanosed with temperature 104° F., pulse 110 to 130, unconscious, and dying. The injections, repeated every six to eight hours, according to indications, and sometimes varying in strength, proved very efficacious.

Sainte-Marie learned that the pneumococcus was influenced by the gum camphor, and having used it successfully in his previous experience, he did not hesitate to employ it and did so with success. The use of camphor to sustain and increase resistance against influenza was not surpassed in effectiveness even by strychnine, which he also gave judiciously.

INFLUENZA AND THE USE OF VACCINES.

EMERY, in the *Practitioner* for February, 1919, states it must be realized that if his theory of influenza is true, the secondary infections which constitute the most important part of the disease may be a patient's own or may be derived from another person. If the disease produces the great fall in immunity which he has suggested, then any virulent microbe which he may harbor in his mouth, etc., and which hitherto has been a mere harmless saprophyte, may attack him. On the other hand, when he is infected by drops of sputum coughed out by an infected person, he may easily be infected simultaneously by the hypothetical influenza germ, and by another

organism, perhaps of exalted virulence from "passage" through the body, against which his resisting powers are slight or almost absent. In this way epidemics in different parts may be different in clinical features, the predominating secondary infections being different; even in the same epidemic and in the same neighborhood the chief secondary infections may be (and we know they are) different in different cases.

The importance of all this arises mainly from the highly practical question of the use of vaccines as preventive and as curative measures. As regards the first question, it is hardly necessary to point out that if the influenza bacillus is not the cause of the disease, we can scarcely hope to get good results from the use of a vaccine made from this organism as a prophylactic measure; it is, of course, remotely possible that the cause of the disease is an organism which will grow symbiotically on our media along with the bacillus, so that we may actually be administering it when we give our vaccine, but this is hardly to be hoped for. On the other hand, by a suitable admixture of the secondarily infecting organisms we may hope to diminish greatly the severity of the disease, by reducing it to influenza alone, minus the other organisms, which are usually the fatal infections.

The only way in which this question can be answered (it is one that every bacteriologist is being asked, almost every hour of the day) is by the results of practical experience on a large scale, and this is not yet forthcoming. The only figures which are known to Emery as having any bearing on the question are those quoted by Eyre and Lowe. They were called in to deal with an outbreak of purulent bronchitis occurring in a camp of New Zealand troops, which was attended by a high mortality, and in which the predominating organisms were B. influenzæ, streptococcus longus, M. catarrhalis, pneumococcus, and sometimes other organisms. This was combated by prophylactic inoculations of a highly complex vaccine, containing pneumococci, streptococci, B. influenzæ, staphylococcus aureus, M. catarrhalis, B. pneumoniæ, and B. septus, with apparently good results. This was first given in March, and in June the epidemic of true influenza occurred, and the figures seem to show that the numbers of uninoculated men who have been affected were very much greater than those of the inoculated. Unfortunately, however, the figures are not given in such a way as to lead us to get a very clear idea of the comparability of the inoculated men and the controls, nor is it obvious whether the figures quoted (2 per 1000 amongst inoculated men and 28.4 in the uninoculated) refer to all cases, and, if so, over how long a period, or refer to hospital admissions only. It is much to be regretted that further statistical details were not given, for the possession of clear proof that the vaccine did actually diminish the incidence of the disease would greatly strengthen our hands in recommending its use.

The question has recently been put on a different footing by the issue of a report by an influential committee assembled under the auspices of the War Office. This committee agreed that there was considerable doubt as to the primary significance of the B. influenzæ, but thought also that a vaccine containing this organism as well as those causing the most important secondary infections—streptococci and pneumococci—might control the incidence as well as the severity of the disease. It is, as Sir Thomas Horder pointed out, a little difficult to understand how the vaccine in question is likely to influence the incidence of a disease when it does not contain the causative organism; however, we have now an official pronouncement which may serve in lieu of definite statistical evidence when we wish to urge the use of the vaccine as a preventive measure and have no observed facts to urge as proofs of its value and innocuousness.

The vaccine which is recommended contains, for the first dose for adults, 30 millions influenza bacilli, 100 millions of pneumococci, and 40 millions of streptococci. No recommendations were made as to the race or type of organisms to be used,

except that the various cultures should have been recently isolated from cases occurring in the present epidemic. Why M. catarrhalis was not included is not clear; it certainly occurs in the lungs in vast numbers in some fatal cases of bronchopneumonia, and Emery knows of no reason to think that it is not a secondary infection of considerable importance.

The second dose is to be twice as large as the first, and is to be given after an interval of ten days.

These recommendations have not escaped a certain amount of criticism. John Matthews, whose method for the isolation and cultivation of the influenza bacillus and whose experience with vaccines made therefrom give him a right to express an opinion, holds that the dose of the bacillus recommended is much too small, and that to a degree seriously impairing the value of the vaccine; he recommends a dose of 150 millions for the first injection and 300 millions for the second. In this he is supported by Sir Thomas Horder, who suggests that the cultures grown on blood agar according to the old technique are much more irritating than those cultivated on Matthews's trypsinized blood. This seems quite possible, and in any future recommendation of a vaccine made of this bacillus it would be desirable that the nature of the medium on which it is to be grown should be indicated.

With regard to the dose of pneumococcus also there is a serious difference of opinion. W. H. Wynn, whose experience of the treatment of pneumonia by vaccines is probably unsurpassed in this country, holds that they are much too small. His criticisms apply mainly to the use of vaccines in treatment, but with regard to prophylaxis he points out that Sir Almroth Wright gave 1000 millions of pneumococci, whilst Lister used much larger doses. Here, again, the question of the culture medium may come in, for he has certainly seen very decided reactions after 50 millions of pneumococci. Very much more information is required on this, as on most subjects in medicine.

As regards treatment, the committee seem somewhat unduly cautious and pessimistic. In severe cases of secondary bronchopneumonia, *i.e.*, when it is most required, they express the opinion that the use of the vaccine cannot be recommended, in view of the dangerous rapidity and severity of these cases, but when it is tried they suggest that the initial dose should not exceed one-twentieth of the first dose described above—that is, one and a half millions B. influenzæ, 5 millions pneumococci, and 2 millions streptococci. Many bacteriologists hold that it is especially in these acute cases of bronchopneumonia that the use of vaccines is most strongly indicated, always assuming that the treatment can be begun early. Thus Wynn urges the immediate treatment of influenza by giving adequate doses within a few hours of the onset; the dose that he suggests is 50 millions pneumococci, 50 millions streptococci, and 30 millions B. influenzæ—how cultivated is not stated. This probably represents the best we can do for the patients, and there seems to be sufficient evidence available to justify us in the belief that patients who have had a dose of vaccine at the very beginning of the attack usually escape without severe symptoms. Further than this it is not necessary to go at the present time. Where expert bacteriological help is at hand, but little time is lost by examining film preparations from the sputum, and giving suitable vaccines accordingly, but this should never be done if it leads to any considerable delay.

The committee suggests that the vaccine is most likely to be of use in the treatment of subacute and chronic cases, and recommends beginning with a dose of one-fifth of the initial dose—*i.e.*, of 6 millions influenza bacilli, 20 millions pneumococci, and 8 millions streptococci. Here, again, the dose, certainly of the first two ingredients, would probably be regarded as much too small by most bacteriologists, and certainly 50 millions pneumococci is a reasonable beginning dose in most cases.

Emery concludes that the position of affairs at the present day is most unsatis-

factory, and it is urgently to be hoped that properly organized research on a wide basis may throw some light on the matter before the next epidemic. At present, we know really but little more than our ancestors did, when they attributed the disease to an "influence" from the heavenly bodies and named it accordingly.

SALICIN IN INFLUENZA.

WATSON, in *American Medicine* for November, 1918, states that in the epidemic of 1889-90 and the recurrent epidemics of '91 and '92, he employed salicin almost from the beginning, selecting it for trial from having just read Dr. Maclagan's article on rheumatism, in which he advocated large doses of salicin in rheumatism—an ounce or more a day—stating that children, primarily treated without success, with salicylic acid and the salicylates, gained strength and were rapidly cured by ounce doses, which he claimed were tonic rather than depressing in their action.

During that epidemic, which was far more universal in its incidence than the present one, he found that salicin given in 30- to 40-grain doses every two or three hours, or, if the onset was at night, a heaping teaspoonful in cold water, at bedtime, was a real specific, as truly so as quinine in malaria. Ever since that time he has continued to depend on it in the sporadic influenzas so frequent every winter and has found it almost always satisfactory.

In the present epidemic, when it could be obtained, salicin has been equally useful, but alas! the crude salicin of the earlier day, which was both cheap and plentiful, has disappeared, and in its place, when there is any, is the purified salicin of the U. S. Pharmacopœia, costing from four to six or seven dollars an ounce, and wholesale houses often have only an ounce on hand. Why this drug was "purified" and where the original crude article, which was very satisfactory, disappeared to, is a mystery that many searches have failed to reveal.

His experience with salicin was published in 1891, in a series of papers on the influenza epidemic written by Dr. Roland G. Curtin and himself, and read at the Philadelphia County Medical Society. The papers were based on over 4000 cases personally observed by them, and which were followed by practically no mortality, little or no true pneumonia, sometimes prolonged sweating, but very generally rapid recoveries.

Many families to his knowledge still treasure the prescription for salicin, and many have kept the drug on hand as a household remedy, taking it by the teaspoonful for the influenzas, with headache, chill, and fever, so frequent in many winters. Recently, in going to have their old friend renewed, these people were amazed at its tremendous rise in price and the difficulty of getting any quantity at any price.

Whenever Watson has been able to get it, the results in this epidemic have been the same, and in some cases that have developed into so-called pneumonia its use has seemed to turn the scale to recovery.

THE EARLY DIAGNOSIS OF LEAD POISONING, WITH SPECIAL REFERENCE TO ABDOMINAL PAIN.

APFELBACK, in the *American Journal of the Medical Sciences* for December, 1918, from the data on hand collected and studied, presents the following conclusions:

1. The manifestations of an intoxication with lead are variable, sometimes presenting only one or two of the cardinal signs of this intoxication, which are colic, constipation, blue line, tremor, basophilic degeneration of the red cells, and pallor and anemia.

2. An early diagnosis of plumbism can be established by the history of lead working, by the presence of constipation, plus one or more of the cardinals: fine tremor, blue line, and basophilic degeneration of the red cells. Constipation with pallor and anemia or with colic presents a suspicious picture which must be worked out by the aid of subsidiary findings.

3. Anemia and fine tremor are very early signs of plumbism.

4. As more lead-workers suffer from

vague abdominal pains and gastric disturbances than from colic the differential diagnosis of any abdominal pain or colic or digestive disturbance demands the consideration of lead as the possible cause.

5. There does not seem to be a consistent rise in blood-pressure in acute or subacute cases of lead poisoning.

6. Over one-third of house painters show signs of plumbism. The high incidence of nephritis, arterial disease, and pulmonary tuberculosis in this occupation must also be emphasized.

THE MODE OF ACTION OF CERTAIN STIMULANTS IN INCREASING AND OF CERTAIN DEPRESSANTS IN DECREASING OXIDATION.

BURGE, in the *Journal of Pharmacology and Experimental Therapeutics* for November, 1918, states that:

1. Stimulants, such as caffeine and theobromine, produce an increase in catalase with resulting increase in oxidation by stimulating the liver to an increased output of this enzyme, while depressants, such as the narcotics, produce a decrease in catalase with resulting decrease in oxidation by decreasing the output from the liver and by the direct destruction of the enzyme. A powerful anesthetic such as chloroform is more effective in decreasing the output of catalase from the liver and in destroying this enzyme *in vitro* than a less powerful anesthetic such as ether. A quickly acting anesthetic such as nitrous oxide decreases catalase more quickly but less extensively than does a slower acting but more powerful anesthetic such as ether.

2. Evidence is presented in this paper to show that depressants such as the narcotics decrease oxidation, which may be the cause of the depression by producing a decrease in catalase, while stimulants such as caffeine and theobromine produce an increase in oxidation, which may be the cause of the stimulation by producing an increase in catalase.

3. The fact that the action of caffeine and theobromine is to produce an increase in catalase with resulting increase in oxidation, while the action of the narcotics is to produce a decrease in catalase with resulting decrease in oxidation, is offered as an explanation for the antagonistic action of these substances.

EPIDEMIC CEREBROSPINAL MENINGITIS AT CAMP WHEELER, GEORGIA.

SCOVERN, in the *Military Surgeon* for December, 1918, gives his plan of treatment as follows: As soon as the cases are admitted, a spinal puncture is made to confirm the diagnosis. If the fluid is under pressure or of a cloudy consistency, from 60 to 95 Cc. of fluid is removed, and from 30 to 60 Cc. antimeningitic serum administered intraspinally, it being the intention to give 20 Cc. less serum than fluid recovered. The injections are repeated at twelve- to twenty-four-hour intervals, according to the severity of the condition and the response to treatment, until all symptoms have disappeared and the temperature has been normal for four days with clear spinal fluid. It is of utmost importance that the treatment be continued for several days after the fluid has become clear and the temperature normal, for if it be discontinued during the first days of normal temperature, these cases will again develop a low continuous fever, ranging around 100°, and have a prolonged convalescence. The complete overwhelming of the last remaining meningococcus can only be accomplished by this plan, and the so-called state of chronic meningitis will be obviated in all probability in the majority of instances.

A great deal has been said about "dry" spinal punctures, and some believe that this is a frequent occurrence. So far as is known, the number of cases upon record that showed fluidless membranes at autopsy are few and far between, so that it seems reasonable to believe that the greater number of "dry" taps are due to failure to get into the spinal canal. However, we will admit that during the course of treatment we occasionally fail to get a flow of fluid

when the canal has been entered, but, on going higher up, a flow of spinal fluid is always obtained.

To obtain the maximum amount of spinal fluid from each puncture is to be desired, as the more fluid removed the greater the amount of serum that can be given. A useful procedure to follow is: after the fluid has stopped coming from the needle, have the individual count to one hundred, taking as few inspirations as possible (or any exercise to collapse the lungs), and the fluid will again come to the needle. In this way from 10 to 20 Cc. more spinal fluid will be obtained.

In the severe and fulminating types the writer has combined the intraspinal and intravenous methods, giving 30 to 40 Cc. serum intraspinally and 60 Cc. intravenously. Nine cases were so treated with no results, so his treatments with the intravenous method have not been as encouraging as those of others who have had greater experience with it. In no case did he see improvement in severe and fulminating types following the intravenous administration of antimeningitic serum, for all the cases receiving serum in this manner died within four to twelve hours after the treatment.

There cannot be too much stress laid on the selection of a potent and active serum, there being wide differences in the various commercial serums put on the market, both in their physical properties and their therapeutic effects.

SPINAL ANALGESIA WITH A NEW LOCAL ANESTHETIC.

KAHLE, in the *New Orleans Medical and Surgical Journal* for February, 1919, states that in operations for various genito-urinary and rectal affections it has been his custom for many years to employ spinal analgesia as the one of choice. Not only is this method of analgesia all that can be desired, but the patient is free from the danger of the immediate and after-effects of ether narcosis. Until the last two months he has given tropacocaine the preference in spinal analgesia, but due to the fact that this chemical was difficult to obtain, and the small quantity which was supplied him seemed to be inferior in quality, he determined to give a comparatively new agent for this purpose—apothesine—a trial.

Being assured that apothesine was low in toxicity and knowing that dentists had used it successfully in conduction anesthesia, he could see no reason why it would not fulfil other requirements for spinal analgesia. Accordingly, on August 22, 1918, the following operation was performed, using apothesine, at the Charity Hospital Clinic:

Patient, colored, male, aged forty-seven. Carcinoma of the penis, sixteen months' duration. Patient was injected intraspinally between the fourth and fifth lumbar vertebræ with one and one-quarter grains apothesine dissolved in 2 Cc. of sterile normal salt solution. Injection was made at 9.25. At this time the pulse was 90, respiration 19. Regional analgesia was complete at 9.30, and the operation was begun. Operation consisted in amputation of the penis and removal of the inguinal glands. Time of the operation, one hour and thirty minutes. Analgesia throughout was perfect, and the patient left the table with pulse 85, feeling fine. There were no after-effects, such as headache, etc.

Since that time he has performed the following operations, using apothesine as an analgesic: Two herniotomies, two vesicovaginal fistulæ, four hemorrhoids, two internal urethrotomies, two prostatectomies, one cystotomy, three inguinal adenectomies, three rectal fistulæ, one hydrocele, one nymphectomy, two internal proctectomies.

Analgesia was perfect in all operations, lasting to the completion of each, the longest of which was one hour and fifteen minutes. Analgesia began within ten minutes, except in the inguinal adenectomies and herniotomies, in which the analgesia was delayed for four or five minutes, due to the length of time necessary for the diffusion of the analgesic to the iliohypogastric and ilioinguinal nerve roots.

The highest point of injection was be-

tween the eleventh and twelfth dorsal and the lowest between the fourth and fifth lumbar vertebræ. There were no after-results attributable to the analgesic in any case.

The use of apothesine in the above number of operations, twenty-four in all, has led him to believe that apothesine is a superior analgesic for this purpose and has the further advantage that it may be boiled for a short length of time without impairing its value.

CAUSE OF EARLY DEATH FROM ARSPHENAMINE.

JACKSON and SMITH, in the *Journal of Pharmacology and Experimental Therapeutics* for November, 1918, conclude that:

1. The slow injection of therapeutic quantities of arsphenamine in very dilute, alkaline solution (monosodium salt) produces no striking results in anesthetized dogs.

2. As the rate of injection and the concentration of the drug are increased, toxic symptoms soon begin to manifest themselves.

3. The earliest of these symptoms consist in a dilatation of the heart, perhaps mainly of the right side at first, a progressively increasing pulmonary blood-pressure, and a slow, gradual, but not severe, fall of the systemic pressure.

4. The cause of this rise in pulmonary arterial tension we believe to be due partly to the alkalinity of the solutions of arsphenamine used, and partly to the specific action of the drug itself. While they have not so far been able to prove that the formation of emboli in the pulmonary arterioles and capillaries may not be in part responsible for the increased pulmonary arterial tension, still they believe that no such action as this occurs.

5. With large toxic doses the right heart may have to contract against a pulmonary pressure increased by 100 per cent above the normal, while at the same time the left ventricle may be contracting against a systemic pressure reduced by 25 to 50 per cent below the normal. These peculiar conditions may tend to establish a state of increased irritability and instability in the heart, and in rare instances delirium cordis may result. Drugs of the epinephrine type might tend to increase the instability of the heart under these conditions.

6. The reactions of the internal organs when arsphenamine is injected are variable, and the reasons therefor are obscure. Apparently both central and peripheral influences are concerned. As a rule, they have found oncometric tracings of the spleen and intestinal loop to show a dilatation, while the kidney usually contracts, sometimes in a most vigorous fashion.

7. The toxicity of arsphenamine is not increased by the breathing of high concentration of carbon dioxide, nor by the injection of calcium hydrate, calcium lactate, or of monosodium phosphate.

8. A number of intermediary compounds occurring during the process of manufacture of arsphenamine were studied. None of these is very poisonous, and they cannot account for the variable toxicity of different samples of asphenamine which may or may not contain traces of one or more of these.

PROPHYLACTIC INOCULATION AGAINST PNEUMONIA.

FENNEL, in the *Journal of the American Medical Association* of December 28, 1918, states that it is better to use one instrument, if one is thoroughly familiar with it, limited though its uses may be, than to use a wide variety of unfamiliar, complicated ones.

He feels that pneumococcus lipovaccine is such an instrument, and has definite assurance that it will prevent infection by Types I, II, and III. Epidemiologic studies of localized epidemics, that would justify the addition of purely local types to the vaccine, are to be encouraged. The lipovaccine is such that much additional pneumococcus material may be added, without increasing its toxicity.

The advantages of such a vaccine—its lack of toxicity, its simplicity of adminis-

tration, and the high degree of immunity conferred—should, during the remainder of this winter, and during the next several years, when we shall probably be called on to combat recrudescences of the pandemic, with its attendant pneumonia, be a useful weapon. Not only should it have its place in the army, but also it should be seriously considered by those physicians in charge of industrial ventures, such as mines, steel mills, ship yards, and the like. Such a vaccine must come from a source that is unquestionable and one that is capable of massive production. Such a demand from civilian sources might be satisfied by the army, if the necessary arrangements could be made, until the supply would be forthcoming from normal channels.

He concludes as follows:

1. Phophylactic pneumococcus vaccination is successful over an extended period of time for those groups represented in the vaccine.

2. A pneumococcus lipovaccine, of slight toxicity, to be given at one injection, has been elaborated, and has had wide-spread use. Early reports indicate its usefulness.

THE TREATMENT OF MALPOSITIONS AND MALPRESENTATIONS.

JARDINE, in the *Glasgow Medical Journal* for November, 1918, reminds us that the head is extended in face presentations and the mentum of chin is the leading part. The face descends in one or other of the oblique diameters of the pelvis with increase of extension, and the chin comes forward under the pubic arch by internal rotation. The head is then freed by a bending round under the pubic arch, which means flexion. Mentoposterior cases act in the same way as occipitoposterior ones. If there is marked extension, and the chin is well in advance, it will come forward through the long rotation; but if the extension is not sufficient to bring the chin in advance, the forehead will come forward and the chin will pass into the hollow of the sacrum. Unless the child is very small there will be complete obstruction.

In dealing with face cases various methods may be adopted. If the chin is to the front the case may be left to nature, and if there is too much delay assistance can be given by forceps. In mentoposterior cases it is better to interfere as soon as the os is fully dilated. The best method to adopt is to flex the head by passing a hand into the vagina with the fingers over the occiput and the thumb on the forehead to bring the occiput down while pushing the forehead up. The presentation will thus be changed into an ordinary vertex one with the occiput anterior. Forceps can then be applied, and the delivery should be easy. Flexing the head is a very easy operation in secondary face cases, in which the extension is due to the hitching of the occiput; but in primary cases, in which the extension is due to a tumor in the neck, or a spastic condition of the muscles of the back of the neck, it will fail. Fortunately such cases are rare. The best treatment for them is version.

In mentoanterior cases flexion of the head is also applicable, but the case will be changed into an occipitoposterior one, and the delivery may be as difficult, unless at the same time the occiput is brought to the front in the way already described.

When the chin has gone into the hollow of the sacrum it may be possible to push the head up and flex it, but if this cannot be done craniotomy will probably be necessary unless the child is a very small one, when it may be delivered with forceps. The blocking is due to the chest of the child and the bulk of the extended head having to pass through the pelvis at the same time, and this can only happen with a very small child.

Brow presentations should be dealt with in the same way as face ones, by flexion of the head and forceps, or by version. In an anterior brow position one may increase the extension and change it into an anterior face position and then deliver with forceps, but flexion is preferable, or failing that version.

Delivery in Flat Pelvis.—The head presents in the transverse diameter with one

or other parietal bone leading. In the majority of cases the anterior parietal bone leads, the sagittal suture crossing the pelvis behind the center near the promontory. When the posterior parietal bone presents, the sagittal suture crosses the pelvis in front of the center near the back of the symphysis pubis. The anterior parietal presentation is much more favorable than the posterior, especially when forceps delivery is necessary. We shall see the reason of this when we study the mechanism of labor.

In the anterior parietal presentation there is first a dipping of the forehead, and then the head slips toward its occipital end, and brings the bitemporal diameter into the conjugate diameter of the pelvis, thus substituting it for the biparietal. This is a very important movement, as the bitemporal diameter is much smaller than the biparietal. The anterior side of the head is now driven down behind the pubes, and the sagittal suture passes upward toward the promontory. This might be called lateral flexion of the head. When it has flexed laterally as far as it can, the side of the head pivots on the back of the pubes, and the posterior side of the head is driven down in front of the promontory. The sagittal suture has come forward to the center of the pelvis, and the posterior side of the head has rounded the promontory and the head is through the brim. As the outlet is enlarged there will not be any further difficulty. A certain amount of flexion will occur, and the occiput rotates forward under the pubic arch.

With a posterior position there is the dipping of the forehead and the slipping toward the occipital end; then the posterior side of the head is driven down by the promontory, the sagittal suture passing up behind the symphysis pubis. The posterior side of the head pivots on the promontory, and the front side is driven down behind the pubic arch, the sagittal suture passing back toward the center of the pelvis. The whole of the front side of the head is resisted by the back of the pubes, and this rounding of the back of the pubes is much more difficult than the rounding of the promontory in the anterior parietal position, because in the latter the only part which is resisted is the small portion against which the promontory impinges. Of course, if the conjugate diameter is too small, the resistance of the promontory will entirely prevent the descent; but Jardine is not considering such cases, but those in which there is sufficient room for the head to pass by natural efforts, or with the assistance of forceps. In many cases the promontory causes an indentation of the skull.

In an anterior parietal presentation the best method of giving assistance, when natural efforts fail, is with forceps. The blades are applied in the usual way, one on either side of the pelvis in the anteroposterior diameter of the head, and as traction is made the mechanism of labor is carried out, the head swinging round its pivot on the back of the pubes. When the head is brought down to the outlet the blades should be removed, and pressure upon the fundus will often finish the delivery, but if not the blades can be reapplied to the sides of the head. During traction the patient should be in the hanging-leg position until the head has passed the brim, as this increases the true conjugate about one-third of an inch. When the head has passed the brim, the lithotomy position should be resumed.

In a posterior parietal position forceps delivery is contraindicated, unless the position can be changed into an anterior one. If the head is not much molded, this can be done by grasping it and bringing the anterior side down while pushing the posterior one up, until the sagittal suture is close to the promontory. If the blades are applied when the posterior side of the head is down, traction will not carry out the mechanism of labor, as to do so the head must be swung back on its pivot on the promontory to bring the anterior side of the head down. One cannot do this with forceps. One may drag the head down by brute force, but the chances of delivering a live child will be very small.

In a posterior parietal position, if one

cannot change it into an anterior one, version is the proper treatment, provided there is no risk of rupturing the uterus. Prior to the introduction of the axis-traction forceps, version was *the* method of treatment in flat pelves, but Jardine believes that in anterior parietal positions of the head axis-traction forceps delivery gives the best chance for the child, but in posterior positions version is to be preferred. If the forceps fail in either of the positions, it is a very common practice to fall back upon version; but Jardine is very strongly opposed to this, as the chances of saving the child are very small, and the chances of rupturing the uterus are very great. Very many of the cases of rupture of the uterus which Jardine has had to deal with in the Maternity Hospital have been caused in this way. When forceps have failed craniotomy is the safest procedure for the mother.

TREATMENT OF ANTENATAL AND POSTNATAL SYPHILIS.

ADAMS, in the *British Medical Journal* of November 16, 1918, states that a Wassermann test should be made on the blood of every patient suspected of suffering from syphilis. More recently he has decided that the best safeguard against overlooking cases of syphilis is to have a Wassermann test made in every case; for some patients, sent as suffering from gonorrhea and without any symptoms or history which would suggest syphilis, have been confined of a child who has had the appearance of the latter disease, and on testing the mother's blood a positive reaction has been found.

Immediately on the birth of the child a specimen of blood is taken from the vessels of the divided umbilical cord in a cubic centimeter glass tube, and a similar amount of the mother's blood is secured for the purpose of a Wassermann test. A small portion of the placenta is also obtained for examination for spirochetes. If further specimens of the child's blood are required, a small quantity, from a quarter to half a cubic centimeter, is best obtained by pricking the heel with a medium-size Hagedorn's needle in three or four places near one another, and allowing the blood to drip into the glass tube. This should be repeated, if necessary, at intervals of a month or six weeks for a further test.

As soon as syphilis is diagnosed in the mother treatment by one of the salvarsan substitutes is commenced, and weekly doses are administered by intravenous injections. At the same time intramuscular injections of gray oil, 40 per cent B. P. emulsion, are given, and he finds that little or no pain is caused by the latter injection. Pregnant women bear intravenous injections of salvarsan extremely well, and these can be given up to the time of confinement. The figures which he gives show that treatment of the mother has a decided influence on the child. The salvarsan substitutes have been galyl and novarsenobillon, galyl in glucose solution being used exclusively for the babies. In the case of mothers the weekly injections begin with a small dose, which is gradually increased until nearly the maximum is given. Intramuscular injections of mercury are given in 1-grain doses on the same day as the salvarsan is administered.

While yielding to none in his admiration for the treatment of syphilis by salvarsan—giving as it does, in the majority of cases and at all stages, results of a brilliance hitherto unattained—he believes at the same time that the administration of mercury is as important for the cure of syphilis as it ever was, and he is inclined to think that too little of the drug is given.

Of the many methods advocated for the administration of mercury, none is, in his opinion, wholly satisfactory.

Intramuscular injections are often painful; the preparation itself frequently varies, and some metallic mercury is usually deposited at the bottom of the bottle containing the cream, showing that the doses given are not uniform.

Intramuscular injection of mercurial compounds such as the benzoate, although practically painless, has to be repeated daily

to get the best results; patients naturally object to these repeated injections, and it is often not possible for the patient to attend regularly.

In administration of mercury by inunction the results depend on several factors which often vary; there is the preparation itself, the time given to the rubbing, and the variations in the absorbing power of different skins. Moreover, it is necessary to get some one experienced in the art to obtain the full effects of the inunction.

Treatment by suppositories, advocated by Mr. Shillitoe and used by him with considerable success, has this disadvantage, that patients dislike the mode of treatment, and the amount of mercury absorbed must vary considerably from time to time, in accordance with the local conditions in the rectum itself.

Treatment by the mouth was advocated by the late Sir Jonathan Hutchinson. His method—namely, the administering of a pill of mercury and chalk with equal parts of Dover's powder—has been used probably more than any other. Administration in this form requires about ten times as much mercury as is the case with mercurial injections. Patients can take mercury in this way without any necessity for the constant attention of their medical adviser, and the effects are generally excellent. Therefore, when it is not possible for patients to be under continual supervision, he is inclined to think this is, on the whole, the most generally convenient way in which to administer mercury.

With regard to treatment by novarsenobillon and galyl there does not appear to be any material difference between the effects, but the former has in Adams's hands had a tendency to produce, in a few cases only, a more or less severe dermatitis; while in one patient, when galyl was used subsequently on several occasions, no such symptoms appeared, but on resuming a medium dose of novarsenobillon severe dermatitis was again set up.

In the Thavies Inn center every dose given to mothers and babies is registered on a chart for future reference, and the weekly weight of the baby is noted.

It is found most convenient to give the intramuscular injections, both of salvarsan and mercury, with a special syringe graduated in fortieths of a cubic centimeter. Thus each division of the syringe corresponds to 1 cg. of mercury. For the purpose of sterilization the needles should be made of platino-iridium, which can be heated in a spirit flame without damaging the point. When galyl in glucose is used the needle must be carefully wiped and water passed through the needle two or three times before heating it in the spirit flame, as a high temperature on glucose causes it to solidify, and renders the needle unfit for use. The syringe which he mentions can be obtained from Messrs. Maw, Son, and Sons.

Even in the weakliest premature syphilitic baby he has never seen anything approaching a local inflammation following an intramuscular injection of galyl or mercury, neither do the injections appear to cause pain. The babies' motions are usually grass-green for a day or two after the injection of galyl, but there is no other evidence of digestive disturbance.

It was difficult at first to determine what dose of salvarsan the babies should be treated with; to give an intravenous injection to a baby from two to seven days old is usually impossible, but he was fortunate enough to find a preparation of galyl in glucose which is admirably suited for the purpose of intramuscular injection. He made a rough calculation by comparing the weight of the baby with that of the mother. A newly born baby is about one-seventeenth the weight of the mother. The average dose of galyl for an adult is 30 cg.; one-seventeenth of that quantity would be about 2 cg. This should be gradually increased up to 5 cg. or more as the child grows, and it is borne very well. The mercury is given in doses from ½ to ⅓ grain or more, corresponding to 1½ to 3 cg.

The safest and most convenient way to give intramuscular injections to new-born babies is in the gluteal region, and if a line

be taken from the anterior superior spine of the ilium to the commencement of the gluteal fold and this line divided into three sections, anywhere in the middle third is the region to select. The intramuscular galyl and mercury injections can be given the same day on opposite sides, and are well borne. It is advisable that there should be an interval of a week to ten days before repeating the injections.

In looking over the number of mothers that he has treated, out of thirty cases six babies have been born free from syphilis, or, to put it more correctly, free from any evidence of that disease, having a negative Wassermann reaction at birth which continued on future examination of the blood, although the mothers have still given positive reaction for a considerable time after delivery.

It has been found that those babies who have at first a positive reaction generally yield a negative reaction after treatment sooner than their mothers. Up to the present he has not found any case in which a baby who had become negative has later developed a Wassermann reaction. The average number of doses of galyl required to bring about a negative reaction has been 6.5, and the amount per case 26 cg. With one exception it has been found that the child gained regularly in weight and showed no further signs of syphilis.

What has impressed Adams most in the treatment of these cases has been the large doses which these newly born infants are able to take and the excellent results which have ensued.

He concludes that:

1. Syphilitic pregnant women can be treated with salvarsan, even up to the day of their confinement, with safety and every advantage.

2. A mother whose blood gives a positive Wassermann reaction may, after treatment, be delivered of a child whose blood gives a negative reaction. The child may continue to thrive and give a negative blood test.

3. Syphilitic children can safely be treated by salvarsan immediately after birth.

4. Salvarsan, combined with treatment by mercury, has a more certain and quicker action in producing a negative Wassermann reaction in the child than in the mother.

5. In nearly all syphilitic children born alive, treatment can convert a positive Wassermann reaction into a negative, and such children appear to become healthy and show a regular weekly gain in weight.

THE BLOOD-PRESSURE CURVE FOLLOWING AN INTRASPINAL INJECTION OF ADRENALIN.

AUER and MELTZER, in the *American Journal of Physiology* for December, 1918, conclude that intraspinal injections of 1 Cc. or 1.5 Cc. of adrenalin in the lumbar regions of monkeys cause a rise of blood-pressure distinctly different in character from the curve obtained after the intravenous injection of adrenalin. The curve of blood-pressure following an intraspinal injection is generally characterized by a slow rise from the original level to the maximum height; by a plateau-like duration of the maximum; by a slow fall to the blood-pressure which prevailed before the injection of adrenalin. It may be stated in general that an intralumbar injection of adrenalin in monkeys causes a much more lasting effect upon the rise of blood-pressure than an intravenous injection. It may perhaps be added that, as a rule, after intraspinal injections the pressure at the end of the pressor effect has not been observed to fall below the original level.

The question discussed in this paper has not been studied in human beings. While there is sufficient experience to show that an intralumbar injection of adrenalin in human beings is apparently innocuous, the effect of such an injection upon the blood-pressure has not been studied properly. When it is considered that in human beings an intralumbar injection can be carried out with greater safety and certainty than in monkeys, the advisability of such studies in clinical physiology is quite evident.

THE USE OF QUININE.

In the *Indian Medical Gazette* for October, 1918, we find the following practical note by MAJOR A. MACGILCHRIST, I.M.S., which has been circulated to certain military hospitals:

Quinine by mouth should be the routine method of treating malaria: very few patients indeed require this remedy to be administered by any other method.

In order to obtain the best results when giving quinine by the mouth, it is necessary to keep in memory certain facts. Strong solutions of quinine are very irritating, sometimes even caustic: care should therefore be taken that a concentrated solution of quinine never exists in the stomach. It is, thus, bad practice to let a patient swallow two or three tablets of a very soluble salt, such as the bihydrochloride, on an empty stomach, for instance, in the early morning. As regards absorption there is little or no advantage in great solubility of the quinine salt when giving quinine by the mouth, because very little quinine is absorbed from the stomach. Quinine sulphate is as good as any other salt for oral administration and not being very soluble cannot cause much irritation. Gastric irritation is also effectually avoided if quinine is taken toward the end of or soon after meals.

Quinine is absorbed mainly from the small intestines and absorption is slow. As the solution of quinine salt enters the duodenum, the alkaloid (quinine) is precipitated by the alkaline secretions of the pancreas. Quinine alkaloid, however, is very soluble in bile, and in practice cholagogues are found to assist greatly the absorption of quinine. As absorption is very slow, the contents of the intestines must not be hurried along too rapidly: active purgation—apart from an initial cholagogue purge—must be avoided.

These are the essential points to be borne in mind when giving quinine by the mouth, and they are excellently met in the composition of Warburg's tincture, the efficacy of which is well known. Warburg's tincture contains several cholagogues and, as these are purgative, their purgative action is counteracted by substances such as opium, which it also contains.

Preliminary purgation with calomel is good. Some follow up the calomel with a dose of magnesium sulphate, but this does harm by washing all bile out of the intestines.

Quinine for prophylactic purposes is best given after the evening meal: its physiological effects (buzzing in ears, etc.) are then produced during sleep and do not inconvenience the men.

In all pernicious cases of malaria, where rapidity of action is important, *e.g.*, cerebral or comatose cases, quinine should be administered intravenously. The usual dose is about ½ gramme (7½ grains) dissolved in two or three pints of normal saline; and the salt generally employed is either the hydrochloride or bihydrochloride. Intravenous saline infusions are now carried out so frequently in the treatment of chorea that the subassistant surgeons are proficient in this method of administration.

Quinine powder and tablets, and still more so soluble, if at all old, often show moldy growths. It is advisable therefore to boil the quinine in a little saline for a few minutes in a test-tube before adding it to the sterile saline for infusion.

There are still other cases of malaria, chiefly of the abdominal type, where on account of gastrointestinal disturbances (vomiting, diarrhea, and dysentery) quinine given by the mouth cannot be retained or absorbed, where rapidity of action is not so urgent as to justify intravenous injection, and where quinine given per rectum cannot be retained. In such cases subcutaneous or intramuscular injections of quinine would solve the difficulty if such injections carried with them the assurance that (1) quinine was absorbed well, and (2) there were no dangers other than those associated with similar injections of such substances as morphia.

There is definite proof, clinical and experimental, that when a concentrated solution of a quinine salt (*e.g.*, 5 or 10 grains in

a 30-minim syringe) is injected intramuscularly or subcutaneously (1) most of the quinine is precipitated at the site of injection and remains there for at least many hours, and (2) the tissues at the seat of injection are killed (necrosed), giving rise to so-called "abscesses" and fibrous nodules and, if the injection is made superficial enough, to sloughing and ulceration.

There is also definite proof, clinical and experimental, that if quinine is injected in great dilution, absorption of quinine is rapid and complete. Further, according to Dr. James, who has used extensively in the Panama Canal Zone this method of injecting dilute solutions (1:15) of quinine, no ulceration or other ill-effect has been observed, although the injections were made into the subcutaneous tissues.

No one contends that no quinine whatever is absorbed from an injection of a concentrated solution of quinine; but there is definite evidence that the patient gets the benefit of very little of the dose thus injected, that he has to suffer considerable local damage to his tissues, and that he has to undergo the risk of certain other complications—tetanus, painful nodules, etc.

The *minimum* therapeutic dose of quinine is exceedingly small: for benign tertian infection it is about 0.1 gramme thrice daily for an adult weighing 11 stone; for malignant tertian, about 0.15 gramme; and for quartan, about 0.2 gramme (3 grains). The corresponding hypodermic dose of quinine, if quinine were completely and rapidly absorbed, would be less than one grain (one-third of oral dose). That some good may result if two or three grains of quinine are absorbed when ten grains of quinine are injected in a concentrated solution is therefore easily understood. But how much better to inject five grains of quinine with a 10-Cc. syringe (dilution about 1 in 34), and have all five grains rapidly absorbed and the tissues at seat of injection uninjured, than to inject 10 grains of quinine with a 30-minim syringe (dilution about 1 in 3) and have 3 grains of quinine absorbed in the first twenty-four hours, the tissues at the site of injection seriously damaged, and the risk of complications and sequelæ owing to the prolonged presence of damaged tissues!

Dr. James (Panama), using a large syringe, injects 1½ grammes (22½ grains) of quinine bihydrochloride dissolved in 20 Cc. of normal saline deeply into the subcutaneous tissues. A still more dilute solution is to be recommended, and this can easily be obtained because Dr. James's dose is unnecessarily large. Five grains of quinine in 10 Cc. of normal saline gives a dilution of about 1 in 34, and a 10-Cc. syringe is usually at hand. This injection may be made deeply in the subcutaneous tissues, following James's method, or intramuscularly; and it may be repeated as often as desired, but one should revert as soon as possible to oral administration. Massage at the site of injection increases the dilution of quinine still more and promotes absorption; injection at two or more places has the same effect.

Clinical Indications.—As already stated, the main use for subcutaneous and intramuscular injections of quinine is in cases of malaria of the *abdominal type,* where quinine cannot be retained and where there is not sufficient urgency to justify intravenous injection.

There are also certain chronic cases of malaria—some exhibiting persistent low fever, others characterized by frequent relapses of fever (about every two weeks)—in which this method of administration is occasionally successful when quinine by mouth has been ineffective. In such cases the desired effect is attained not by more quinine being absorbed but by the psychic effect upon the patients who are "run down:" any procedure (hypodermic injections, tonics, change of air, etc.) which raises the patient's hopes, spirits and vital forces helps quinine.

Technique.—A large serum syringe should be used instead of a small minim one. The quinine solution should be freshly prepared because solutions of this substance are apt to get moldy in a few days; it should

be boiled carefully for a few minutes and injected while still warm. Ordinary surgical precautions should be taken as regards syringe, needle, and skin of patient. The deltoid and gluteal regions are the favorite sites for intramuscular injections; large nerves and blood-vessels must be avoided. It must always be borne in mind that the greater the dilution of quinine, the less the damage to tissues at site of injection, and the less the risk of such complications as tender nodes, sloughing, ulceration, necrosis, thrombosis, paralysis, and tetanus.

Dose.—The dose should be from 5 to 10 grains: seldom should more than 10 grains be required if given sufficiently dilute so as to insure complete absorption. If the dose is increased above this and dilution diminished, the result is precipitation of quinine locally, less quinine absorbed, greater damage to tissues locally, and greater risk of complications. Therefore give small doses, *e.g.*, 5 grains, well diluted and repeat when necessary. If given in a dilution of about 1 in 40, quinine hydrochloride may be used instead of the bihydrochloride, and has the advantage of being a neutral salt. Just as the sulphate by virtue of its low solubility is preferable for oral administration and can cause little gastric irritation, so the hydrochloride on account of its comparatively low solubility is preferable to the bihydrochloride for subcutaneous and intramuscular injections, and is less likely to produce complications.

THE DIRECTION OF THE NEEDLE AND THE PROPER ROUTE FOR LUMBAR PUNCTURE IN CHILDREN AND ADULTS.

REGAN, in the *American Journal of the Medical Sciences* for January, 1919, states that there is considerable conflict of opinion among authors as to many of the details of the operation of rachientesis. The route for puncture and the direction of the needle are among the points over which there is much controversy. Yet it is unquestionable that these two parts of the operation must be properly carried out in order to bring it to a successful termination. From clinical experience, which was later confirmed by experimental work upon the cadavers of adults and children, both in the dissecting room and at the autopsy table, he believes the following conclusions upon these points are warranted:

1. The median route is greatly superior to the lateral route for the puncture of children by reason of its simplicity. The lumbar spinous processes of children are rudimentary, rather short, horizontally directed and partly cartilaginous processes, which have a fairly even superior and inferior border, somewhat rounded at the summit of the process but without any tendency to overlap. When the spine is well flexed there exists between them an interval (the interspinous space) which is usually quite wide and which permits the introduction of the needle in the median line without any liability of touching the spines. The distance to be traversed is very small, especially in young children; in fact, after the needle has pierced the skin and the supraspinous ligaments it quickly glides through the interspinous ligaments and is immediately felt to penetrate the dural sac. In the case of young children and infants a slight resistance is offered by the rather tough supraspinous ligaments, but this is easily overcome and is the only difficulty encountered in the median line. The quickness, simplicity and certainty of the result and the easy facility with which a beginner acquires the method are among the many points in favor of the median route for young patients.

2. The construction of a child's spine differs from that of an adult's. At an early age the vertebræ are not distinct and separate bones connected by ligamentous attachments as they are later in life; but, on the contrary, they appear *en masse,* partly cartilaginous and united into one piece, from which the individual bones are separated only with difficulty. The line of cleavage and the degree of movability are more definite between the spinous processes than elsewhere. The laminæ are rather

short, wide, and the interlamellar spaces are directed rather obliquely downward and are quite narrow, further adding to the difficulty of the lateral route.

3. Many authors base their objection to median puncture in the adult on the thickness and resistance which they claim the interspinous ligaments offer, especially in muscular individuals. To determine the basis for this argument the author studied these ligaments on several adult cadavers. This study gave the followng findings: The supraspinous ligaments are rather tough, fibrous, cord-like ligaments extending between the summits of the adjacent spinous processes. The interspinous ligaments are rather thick, quadrilateral-shaped, pearl-colored ligaments attached along the whole length of the inferior border of each spinous process from its root to its summit and extending downward to the same parts of the superior border of the spinous process below. The ligament is in reality composed of two folds and layers of lateral fibers, with a clearly defined line of cleavage between. For this reason when a needle is introduced in the median line after penetrating the supraspinous ligament it enters the interspinous ligament and passes along between its two layers and is thus guided forward with precision to the interarcual space. Marked resistance is not encountered even in muscular individuals except in rare instances. Therefore, instead of the interspinous ligament being a contraindication to the use of the median route, it is in most cases a great aid in holding the needle safely to the median line and directing it thus to the interarcual space, often, indeed, with unerring precision.

4. Among the advantages of the median line for puncture of adults are the following: It is a clearly defined procedure and is quickly and easily learned by the inexperienced; no calculation is necessary as to the direction inward and upward to be imparted to the needle in order to reach the interarcual space as in lateral puncture. The liability of striking bone and bending or breaking the needle or wounding the periosteum is less. The possibility of passing beyond the limits of the interarcual is reduced to a minimum, while it is ever present with the latter route. The injury of nerve filaments or spinal blood-vessels is less likely to occur. No difficulty is experienced in penetrating the dural sac exactly in the median line, as in the lateral route, which point is important for spinal anesthesia and serum injection. The chances of the needle being plugged by the tissues traversed and of blood-vessels being encountered are less with the median than with the lateral route. Dry taps are less common in median puncture. In other words, chance plays a great part in lateral puncture, while in median the operator arrives usually with unerring precision at the interarcual space.

5. In the case of children the needle should be introduced directly perpendicular to the spine (at an angle of 90 degrees) and in the median line. This method is obviously the rational one to employ, as a study of the characteristics of the lumbar spinous processes and the shape of the interspinous spaces shows. The needle then encounters no bony obstruction and is passed into the subarachnoid space without difficulty. Any upward inclination increases proportionately the danger of a dry tap.

6. In adults the anatomical structure of the spine differs from that of a child, and this fact influences markedly the manner of insertion of the needle. The lumbar spinous processes are not as horizontal as at an early age, but have a distinct downward inclination, which is considerably increased by a projection of the tubercles on the inferior border. Flexion of the spine widens the interspinous intervals, but does not appreciably alter the direction of the spines themselves. With the spines well flexed, however, the interval between the adjacent processes is widened sufficiently to allow the introduction of a needle in the majority of instances in a perpendicular direction (90 degrees) to reach the subarachnoid space without encountering bone. In some

cases (a decidedly minor percentage) it is impossible to introduce the needle in a perpendicular direction without having it impinge on the bony obstruction of the superior border of the spinous processes of the vertebræ below. In such instances the needle's course should then be changed by withdrawing it slightly and directing it obliquely upward at an angle of 60 to 45 degrees, and this will always, except in rare cases, be followed by the disappearance of the bony obstruction and the entrance of the needle into the subarachnoid space.

7. It is possible to obtain fluid by the median route in adults, even in cases of marked opisthotonos, if a sufficiently marked inclination upward is given to the needle.

8. Flexion of the spine is attained only with difficulty in elderly individuals, hence the needle should be introduced slightly upward from 70 to 45 degrees.

9. Certain anatomical configuration of the spine helps to explain why some cases of failure to obtain fluid by the median route, with a perpendicular insertion (90 degrees), may be due to a deviation of the instrument from the median line and its impinging on the superior border of the lamina, while a more upward inclination would have been entirely successful even though a similar deviation of the needle occurred.

ATROPINE AND INDUCED ANTIANAPHYLAXIS IN ITS RELATION TO ARSPHENAMINE.

STOKES, in the *Journal of the American Medical Association* of January 25, 1919, summarizes his article on this subject as follows:

1. The acute "nitritoid" crisis or reaction to arsphenamine is a form of anaphylactic shock, explainable on physiochemical grounds as the result of a precipitation either of the drug from its colloidal solution, or of the colloids of the blood plasma, by the drug, or by an impurity. The reaction following the injection of an acid or only partially alkalinized solution of arsphenamine, either too rapidly or in too high concentration, is presumably of the same type.

2. The nitritoid crisis can apparently be inhibited by a previous injection of atropine (1/50 grain), which further suggests that the reaction is a form of anaphylactic shock.

3. The induction of antianaphylaxis further supports the belief that the nitritoid crisis is a form of anaphylactic shock.

4. The induction of antianaphylaxis in patients exhibiting persistent idiosyncrasy to arsphenamine or neoarsphenamine has proved clinically useful, and, as a means of increasing their tolerance of the drug, deserves further trial and study.

VITAMINES.

The *British Medical Journal* of December 14, 1918, calls attention to the fact that in a previous communication the Royal Society had allotted one of the Royal Medals to Dr. F. Gowland Hopkins, F.R.S., Professor of Biochemistry in the University of Cambridge. The terms of the award give so succinct an account of Professor Hopkins's work in regard to the accessory factors in diet that it reproduces the text, for which it is indebted to *Nature:*

"Professor Hopkins was among the very earliest, if not actually the earliest, to recognize and announce that minute quantities of certain bodies, the nutritive value of which had hitherto been unsuspected, exert an enormous influence upon growth and upon normal adult nutrition. He showed that without these accessory factors—vitamines—a diet otherwise full and seemingly complete is incapable of allowing growth, and even of maintaining body weight or life. He has also made important researches into what may be styled the determination of the specific nutritive values of individual main components of the protein molecule; he has, for example, shown that when, from a certain diet which has proved to maintain nutrition satisfactorily, the two amino-acids, arginine and histidine, were

together removed, the diet, though amply sufficient in energy and fully assimilable, failed to maintain life. More recently Hopkins has attacked the question whether an animal's life can be maintained under the condition that, in place of protein or of the entire set of amino-acids constituting protein, a limited few of the several representative types of these constituents are provided in the diet. He shows that when, instead of the eighteen different amino-acids composing the protein, five only are administered, death rapidly ensues if those five be selected from the simpler alipathic components—for example, leucine, valine, alanine, glycine, and glutamic acid; but that, on the other hand, nutrition and life are satisfactorily maintained, at least for a considerable period, if the five amino-acids given be chosen from the more complex types, such as tyrosine, tryptophane, histidine, lysine, and cystine, which experiment has shown to lie outside the range of the synthetic power of the animal body."

LESSONS FROM A STUDY OF ONE THOUSAND DIPHTHERIA DEATHS.

CAREY, in the *Boston Medical and Surgical Journal* for January, 1919, states that in some instances it was noted that physicians waited for a laboratory report from their cultures before administering antitoxin. This is, of course, a mistake, and the dictum that a person needing a culture should have antitoxin administered at the time of taking the culture is one which should be reiterated until the procedure is generally adopted by the entire medical profession.

One other factor which stands out demanding comment is that 7.6 per cent of the deaths occurred in "unrecognized" cases. Here, indeed, is a sad state of affairs, for with the numerous laboratories scattered throughout the State there is no need for diphtheria being unrecognized. The State Department of Health, through its bacteriological laboratory, is ready to examine all cultures which may be sent in to it, and will on all positive cultures telephone or telegraph, at its own expense, the report to the physicians who have sent in the cultures. Surely, with this free service of the laboratories, the free distribution of antitoxin and Schick material for detection of the non-immune, and the toxin-antitoxin mixtures of immunization, we feel that we have some right to expect that these facilities will be used to effect a diminution of the morbidity rate as well as the mortality rate.

An alarming percentage of 11.8 of these cases were found moribund upon visitation by the physician. Here again is evidence for the necessity of awakening people, through educational methods, to their responsibilty to their children.

Another cause of death which the investigation showed in larger proportion than is generally recorded was that of sudden death which was stated to have occurred in 5.2 per cent of the cases. In many instances lack of nursing care was the responsible factor. Parents, ignorant even of the fundamental principles of nursing, were entrusted with the care of their children, allowing them to get up out of bed too early, or, through a mistaken idea of kindness, gave unsuitable food, which caused grave gastric disturbances resulting in vomiting, with its associate muscular strain, and proving, in these instances, too much for the weakened cardiac muscles; and collapse, with death, resulted.

Another factor in the sudden-death group appeared to be the repeated attempts at intubation where, for some reason, the tube was either not properly introduced or else expelled.

The dosage of antitoxin was extremely varied in amount, the number of doses given, and the interval between dosage. In 29 instances it was found that less than 3000 units were administered. The amount increased from this to a point where a young child of three years received 225,000 units. The usual doses, however, seem to have been from 6000 to 9000 units. The number of doses varied from one to several on consecutive days, and in a few instances

it was administered every four hours until death occurred. In one instance 80,000 units were given in this manner.

One striking feature was present—in no instance did Carey find antitoxin given intravenously. In the early days of the use of serums there was a great deal of hesitancy in introducing directly into the blood stream foreign bodies, for fear of untoward effect, but with added years of experience it is now known that this procedure is not only feasible but that results are more rapid, more certain, and a much smaller amount of serum is required. It is most earnestly recommended that this procedure be used in those cases which are seen late in the disease.

With such a lack of uniformity in the use of antitoxin, it seems as if the medical profession should be informed, from authoritative sources, as to the most approved method of its use, its dangers through misuse, either in dosage or method of administration.

Particular stress should be laid, in the instruction of medical students, upon the necessity of properly administering antitoxin, thus avoiding the chances for anaphylactic reaction and impressing upon them the need of early and sufficient treatment.

Full realization of these facts can only lead to the conclusion that the progress toward eradication of diphtheria has fallen short of what reasonably might have been expected.

SPECIFIC SERUM THERAPY IN PNEUMONIA.

REDDEN, in the *United States Naval Medical Bulletin* for January, 1919, states the question naturally arises, How does the specific immune serum act toward the pneumococcus and its products? In the first place, Bull has demonstrated that it clears the blood stream of organisms and causes agglutination; that it opsonizes the organisms so that after agglutination they are phagocyted in enormous numbers. Blake showed that when pneumococci were agglutinated by specific antiserum, methemoglobin formation was diminished or lost. *In vitro,* antipneumococcus serum inhibits the growth of the homologous organism, inhibits or markedly delays fermentation of inulin and the splitting of protein. And lastly, Cole has demonstrated that the immune serum has a high antitoxin and antihemolytic titre, which in all probability plays an important rôle in combating the strong endohemotoxin. Redden simply presents the data and offers the suggestion that here is at least one possibility why specific antipneumococcus serum is of use in combating type pneumonias.

TREATMENT OF PNEUMONIA AND EMPYEMA.

After a large experience at the United States Naval Hospital, Newport, R. I., ASSERSON and RATHBUN, in the *United States Naval Medical Bulletin* for January, 1919, state that pneumonia with pleural involvement and complicating empyema are difficult cases to handle, but with conservative treatment, until the pleural sac is well walled off, a very great majority of them can be pulled through. Early operation gives much poorer results and a big reduction in recoveries. After observing the effect of early operations upon their empyema cases, conservative treatment became their routine. Their experience in the management of pleurisy with effusion complicating pneumonia developed the following method of treatment:

The exudate is allowed to accumulate until there is evident mechanical embarrassment of the heart or lungs, when from 200 to 600 Cc. are removed by the Petain procedure. This operation is repeated from time to time as indicated by symptoms of overloading. Their technique for removal was: The skin is prepared by painting the area of operation with tincture of iodine. The sixth or seventh interspace in the midaxillary line is generally selected and the

tissues along the track of the needle, including the parietal pleura, are infiltrated with a generous amount of novocaine (0.5 per cent) injected through a long, fine hypodermic needle. After waiting for about ten minutes, a small calibre needle (spinal puncture needles are excellent for this use) is introduced while attached to a syringe containing about 2 Cc. of novocaine (0.5 per cent). If the patient complains of pain a small amount of novocaine is injected as the needle is slowly inserted, particularly when the parietal pleura is reached.

This procedure not only helps to control pain but, in case of an erroneous diagnosis, tends to protect the lung by pushing it away from the needle point. The needle should not be pushed from side to side, after the pleura is reached, unless there is a free flow of fluid. Ethyl-chloride spray is contraindicated, as it fails to control pleural shock. The fluid should be withdrawn slowly, and if the patient complains of thoracic pain or has a coughing attack, the needle is removed and aspiration stopped for the time being, on the assumption that the pain and cough are due to contact of roughened pleural surfaces. It has been found unwise to remove large quantities of exudate, owing to the pleural shock which occurs when any considerable areas of parietal and visceral pleura are approximated. This has been the cause of considerable prostration and discomfort, two things that should be avoided if possible. In addition, the resulting increase of cough has a decidedly bad influence on the cardiac action and draws upon the reserve power of the heart. There is also danger of tearing the lung, in case organized pleuritic adhesions are present, when too large an amount of fluid is withdrawn and the lungs are forced down violently by severe coughing.

As a result of their experience they feel that the effusion *per se* has no harmful influence upon the patient's condition that would necessitate any considerable removal, so its mechanical action has been made use of as a therapeutic measure in the same way as nitrogen is used in the artificial pneumothorax treatment of tuberculosis. They found that pneumonia did very well when the affected lung was collapsed by an effusion, and of late it has been a part of their plan to keep the lung compressed until the pneumonic process was well under control and the effusion had become purulent.

The keeping of visceral and parietal pleuræ apart during the acute stage tends to obviate the formation of adhesions and thereby facilitates operative procedure when the effusion is ripe for surgical intervention.

By the above method it has been found possible to tide over even the very severe pleural cases, provided there was profuse exudation. It seems probable that the amount of pleural effusion is a good index of the patient's reacting powers, and a profuse flow should be looked upon, not as a menace to the life of the patient, but as nature's method of combating the infection. This should be curbed, during the acute stage, only when nature becomes too radical in her fluid production.

THE PRESENT STATUS OF THE TREATMENT OF SYPHILIS.

SCHAMBERG, in the *Pennsylvania Medical Journal* for January, 1919, states that the spirochete is vulnerable to arsphenamine and to mercury. The iodides do not appear to have any direct destructive influence on the spirochete. In an attempt to eradicate every spirochete as early in the disease as possible, why should we not shoot with two arrows? He realizes that Wechselman has warned against the use of mercury precedent to the use of arsphenamine, on the grounds that in his belief most of the arsphenamine fatalities are due in large part to renal insufficiency, and that in the majority of cases it was mercury that damaged the kidneys. There can be no doubt that mercury has a strong affinity for the renal cells. We are all familiar with the dominant symptoms in bichloride of mercury poisoning. Drs. Kolmer, Raiziss and he have demonstrated in experimental animals the noxious influence of large doses

of soluble and insoluble mercurial preparations on the kidneys. He believes that there is a considerable element of truth in the assertion that renal insufficiency is commonly a factor in contributing to or in actually causing deaths from the administration of arsphenamine.

As regards the poisonous effects of mercury, much depends on the manner in which the drug is used. Intravenous injections of the insoluble compounds, such as gray oil, calomel, or the salicylate of mercury, should be used only in small dosage (i. e., not over 1 grain), and with a careful watch on the condition of the kidneys. A weekly injection of even 1 grain will lead to accumulation of the drug in the tissues. Within the past fortnight a death occurred in one of our clinic patients from uremia, following weekly injections of 1 grain of the salicylate of mercury. The safest method of administering therapeutically active doses of mercury is by inunction.

His belief is that the use of three inunctions of mercury per week is a valuable measure to associate with the use of arsphenamine, particularly in the primary and secondary stages of syphilis, at which time rapid sterilization is aimed at. The arsphenamine may be administered in 0.4- to 0.6-gm. doses. (depending on sex and body weight) once a week, or preferably in 0.3-gm. doses twice a week. He believes the conjoint use of arsphenamine and mercury in moderate dosage is safer than the employment of either one singly in intensive dosage. The biweekly use of arsphenamine has the disadvantage of causing an increased inconvenience to the patient and of augmenting the expense of treatment, but in the manner suggested he believes that it combines safety and efficiency better than other methods.

No one is in such an authoritative position today as to state how long the treatment of syphilis should continue. Too often the physician will cease treatment after a single series of arsphenamine injections and perhaps a course of mercury, because the Wassermann has become negative. Experience proves that such a course usually requires the later resumption of treatment, with valuable time lost. While it is difficult to prescribe any routine formula, we may at least indicate an irreducible minimum of treatment.

A patient with an early chancre and a negative Wassermann reaction should receive at least two series of arsphenamine administrations, each consisting of six intravenous injections, and two courses of mercurial inunctions, each consisting of thirty rubbings. The likelihood of abortive cure with such a treatment is good.

Primary syphilis with positive Wassermann reaction and a secondary syphilis will require at least 50 per cent more treatment during the first year. Treatment should be continued during the second year with somewhat decreased intensity, and during the third year with a diminishing number of treatments. If the Wassermann reaction remains positive, the treatment must be continued with such modifications as may be indicated by spinal fluid findings. He has had patients whose persistently positive Wassermann reactions were rendered negative by intraspinal medication, where such treatment was indicated by pathologic spinal fluid findings.

SERUM TREATMENT OF POSTINFLUENZAL BRONCHOPNEUMONIA.

KAHN, in the *Journal of the American Medical Association* of January 11, 1919, summarizes his article as follows:

1. Twenty-five patients with clinically grave prognosis, toxemia, extreme dyspnea and cyanosis and extensive lung involvement were treated with serum from convalescent influenzal bronchopneumonia patients.

2. The mortality, as determined from the final disposition of the patients in this series, was twelve, or 48 per cent.

3. Eighteen other patients with prognosis equally grave clinically were used as controls and treated like the others, but without the use of serum.

4. The mortality in this series was twelve, or 66.6 per cent.

5. The selection of the most severely ill patients was deemed more correct for judging the value of the immune serum than the selection of a series of consecutive patients, the larger number of whom would recover without the use of the serum.

6. From the relative percentage mortality in the two series, as well as from the surprising beneficial effects of the serum in individual cases, he believes that serum from convalescent influenzal bronchopneumonia patients deserves further trial in the treatment of the disease.

7. It may perhaps act as a favorable antitoxic factor in the circulation to assist in the general reaction to the pathologic process.

8. It must be emphasized that the number of cases in this series does not warrant very positive conclusions.

THE VALUE OF VENTRICULAR PUNCTURE FOR THE EARLY DIAGNOSIS AND SERUM TREATMENT OF POSTERIOR BASILAR MENINGITIS IN INFANTS.

ZINGHER, in the *American Journal of the Medical Sciences* for January, 1919, states that the treatment consists of puncture, daily or every other day, of the lateral ventricles, withdrawal of the fluid and reinjection of a suitable amount of antimeningitis serum. The interval between punctures and the total number of punctures will depend upon the clinical course and the examination of the ventricular fluid. From four to six punctures and injections of serum may be required. The amount of fluid withdrawn from the ventricles varies from 20 to 50 Cc., and the amount of serum injected from 15 to 35 Cc. The treatments are not discontinued as soon as the ventricular fluid is found sterile on culture, but one or two additional serum injections should be given. Cases of meningococcus meningitis are occasionally observed that are not treated sufficiently with serum and subsequently show relapses, as indicated by an increased temperature and reappearance of positive meningococcus cultures in the spinal fluid, even though the latter had for a few days been negative in cultures.

The technique of ventricular puncture is simple, but requires certain precautions. The infant should be wrapped in a sheet and placed in the dorsal position, with the head brought near the edge of the table. The area over and around the anterior fontanel is shaved, if necessary, and sterilized with tincture of iodine. One assistant holds the head of the infant firmly between his hands and another secures its body. The operator sits at the head of the table. The lumbar puncture needle used in this operation should preferably be not larger than a No. 18 gauge, three inches long, and have a short beveled point (George Tiemann & Co.). The needle is introduced through the anterior fontanel on a horizontal line connecting the two lateral angles, 1 cm. from the middle line, in order to avoid injuring the longitudinal sinus. It is passed to a depth of from 2 to 5 cm., when the lateral ventricle will be readily reached. The direction of the needle from its insertion through the scalp is almost perpendicular but slightly outward and forward. The needle is held very gently and supported, rather than firmly fixed, between the fingers. The plunger in the needle is removed and the ventricular fluid allowed to escape into a test tube, which is held by an assistant. If the fluid flows out too rapidly its escape may be temporarily stopped by partly reintroducing the plunger in the needle. The small size of the needle will avoid too rapid a removal of the ventricular fluid and injection of the serum as well as unnecessary trauma of the brain tissue. After withdrawing the fluid from the ventricle a gravity outfit, consisting of the barrel of a 10- to 20-Cc. syringe and connecting rubber tubing, is attached by an assistant to the needle, and the antimeningitis serum, previously warmed to body temperature, is slowly injected. Care should be taken to reinject less fluid than is removed. At the

end of the operation the needle is gently withdrawn and a sterile dressing applied. It is not necessary or advisable to wash out the ventricle with salt solution before the injection of the serum. For repeating the injection it is preferable to use the other ventricle. Each specimen of fluid withdrawn is carefully examined by smears and bacteriological cultures.

The infant should be kept in the hospital under observation for at least four weeks after convalescence has set in. Before discharging the patient a lumbar puncture should be made to see whether a clear spinal fluid can be obtained. This would indicate the reëstablishment of the communication through the foramina of Magendie and Luschka between the ventricular cavities in the brain and the subarachnoid space in the spinal canal.

Every effort should be made to have the breast feeding continued during the patient's stay in the hospital. This is an important feature of the treatment, as changing to bottle feeding is likely to greatly diminish the chances of the infant's recovery. After the patient has been discharged from the hospital, observation should be continued for a period of several years to determine any possible impairment of the mentality or of any of the special sense organs.

THE PRESENT STATUS OF THE TREATMENT OF FLAT FEET.

Burk, in the *United States Naval Medical Bulletin* for January, 1919, states that the treatment depends upon the degree of the flatfoot. In all cases attempts should be made to relieve local and underlying constitutional causes. For the mild cases adhesive strapping, proper shoes, and graded exercises are recommended. These exercises as described by McKenzie are:

1. Patient sitting, leg extended and supported just above the ankle. Grasp the right foot just above the ankle with the left hand. Place the right hand on sole of foot, with thumb pointing toward the toes, grasp foot firmly, circumduct foot slowly as follows: Extension, inversion, flexion, and eversion. This should be done by the attendant with as much force as can be used without pain, and repeated 30 times.

2. These same movements should be done by the patient without help.

3. Patient standing, toes in and heels out, and about 12 inches apart; rise on toes and press out slowly. Repeat 30 times.

4. Patient standing, feet parallel and 6 inches apart. Raise the inner side of the feet, throwing the weight on the outer side. Repeat 30 times.

5. Patient standing with feet parallel, weight resting on outer side of the feet. Walk forward and backward 30 steps, keeping feet parallel and forcing down ball of feet.

6. Patient standing, feet 12 inches apart and parallel, knees bending and outward pressing.

7. Patient standing, feet 6 inches apart and turned in, rise on toes and walk forward and backward 30 steps, crossing feet and keeping toes in.

8. Standing firm, right lunge forward, neck firm, bend right knee until heel is forced from floor, keeping weight on outer side of foot. Repeat 10 times and do same with the left.

9. Standing, feet parallel, 6 inches apart, sway slowly forward and backward on heels and balls of feet, chest active, and chin in.

10. Raise heel 1 inch from the floor and walk without bringing heel down, as if heel was painful. This may be done repeatedly with both heels.

For the severe cases operative treatment is advised. Katzenstein injects 0.5 Cc. of 4-per-cent formaldehyde into the weak points of the tibio-navicular ligament, with the idea of hardening this ligament, and then puts the foot in a plaster-of-Paris cast for a month. Local anesthesia is necessary in this treatment. He often gives small amounts of morphine also if necessary.

TEN YEARS' EXPERIENCE OF RINGWORM IN PUBLIC ELEMENTARY SCHOOLS.

BOWEN (*Boston Medical and Surgical Journal,* Dec. 12, 1918), considering this subject, quotes Priestly to the effect, after ten years' experience, based on country area containing 80,000 schoolchildren, that there is a connection between ringworm and impetigo contagiosa, both occurring at about the same age, being equally infectious, endemic in the country, and appearing as single cases or in little groups. These epidemics in both cases cease, as a rule, as suddenly as they appear, so that it is often a question whether their disappearance is due to the preventive measures taken. Ringworm on the hairless skin is, as is well known, as easily and quickly cured as impetigo.

As regards treatment, Priestly considers that it has entered on a new phase since the *x*-rays were used on the principle that this offers a convenient mode of epilation, which is necessary in order to get at the mycelium and spores. We have now practically the means of completely controlling the individual case, but the drawback is the time required, about two months; and, besides, there is temporary baldness and, theoretically, the fear of damage to the brain cells. It is also a somewhat costly method. It must also be remembered that ringworm is not a dangerous affection in itself, and that it probably invariably disappears before puberty. To these facts may be added its low grade of infectiousness—so low, in fact, that with certain simple precautions we need not exclude children from school—and the knowledge that it is so seldom epidemic.

With regard to administrative measures, head teachers at once notify of suspected cases, and the medical inspector proceeds to verify at the next regular inspection, the teacher meanwhile treating the case as if it were ringworm, and suggesting that the parents consult a physician. The hair is to be cut short and some simple application, like carbolized oil, used to prevent the hair from flying about. If these precautions are refused or neglected, the teacher is expected to forbid the child's attendance. The caps are of good blue cotton and shaped like polo caps; the bonnets pink or gray and shaped like sunbonnets; they are boiled and washed twice a week. It is seldom that it has been found necessary to close a school.

THE FEMORAL ARTERY IN WAR SURGERY.

Writing on this topic NICOLL (*British Medical Journal,* Nov. 23, 1918) notes that amputation at the hip (transarticular, transcervical, transtrochanteric, or subtrochanteric) is one of the most common and one of the most critical of amputations. Hemorrhage is its chief risk.

In amputations, and in operations for compound "smashed" bones, hemorrhage may be controlled by one or other of three methods, namely, the tourniquet, manual compression of the femoral artery, and temporary ligation of that vessel. The last mentioned, however useful it may be in a few cases in civil practice, has little field in war surgery, where the choice lies between the tourniquet on the thigh and digital compression of the femoral artery. The tourniquet is necessarily in universal use at present at the fighting fronts, where there is no substitute for it in certain circumstances. Its use also in operations is part of the stock teaching of our text-books. But opinion is veering against its use.

Its disappearance from the operating theater would involve considerable revision of sections of our text-books. Opinion has not yet crystallized, but there are many surgeons who at present very rarely indeed use a tourniquet, and that only when amputating with no assistance, skilled or unskilled. Nicoll has not for many years used a tourniquet for any operation, and has found, in the lower limb, digital compression of the femoral artery against the pubic ramus quite efficient. A colleague requires no instruction, but an orderly, a sister, or a student, if

acting for the first time, generally requires coaching on three points, namely, to stand on the outer side of the limb, to fix the thumbs for counter-pressure on the postero-external aspect of the ilium below the level of the anterior superior spine, and to press the fingers on the vessel just below Poupart's ligament. If the fingers are placed lower down the limb the artery is not caught firmly against the pubic ramus, and if the thumbs are placed against the trochanter instead of the ilium the hands are apt to be displaced during the operator's manipulations of the limb. Digital compression of the femoral is quite easily maintained by any hand of average size and strength in even the most muscular patient during the course of any amputation. During such operations as that for removal of smashed bone and damaged tissue or the excision of a tumor, compression is often not required at all, the compressor simply keeping his fingers on the femoral pulse ready to tighten his grasp instantly on request.

Open stumps include guillotine stumps, flap stumps awaiting secondary suture, and stumps in which the sutures have cut out and the wound is gaping. The last is always, and the two first named ultimately often, suppurating and sloughing. Under such conditions secondary hemorrhage is a constant risk at any date after the first week, by which time the ligature is absorbed or dissolved in the pus. In all open aseptic stumps in the thigh which are a week or more old he makes it a routine practice, as a preventive measure, to ligature the common femoral vessels. By the end of the first week after amputation the collateral circulation after ligature of the common femoral is ample for the needs of any stump down to the supracondylar level. For open stumps below that level, and certainly for those below the knee, ligature of the femoral in a septic limb carries a grave risk of resulting gangrene. Fortunately the need for it in such cases is less clamant than in high stumps. In the latter secondary hemorrhage constitutes too often a rapidly completed tragedy. In leg stumps the flow is much less copious (from one only of the three branches, anterior or posterior tibial or peroneal) and leaves time for the sister or orderly to apply the tourniquet or compress the femoral while the assistance of the surgeon is being got.

THE SUCCESSFUL SECONDARY SUTURE OF ULNAR NERVE IN A CASE OF TOXIC NEURITIS.

Owen (*American Journal of Surgery*, December, 1918) reports the following case: A girl, aged eleven years, came under his observation and was operated upon May 2, 1918. Six months previously, *i.e.*, in December, 1917, while attempting to open a fruit-jar the glass broke and a sharp fragment divided the flexor tendons and the ulnar nerve of her left hand. Primary operation performed by another surgeon was not entirely successful as the first two fingers and about half of the third finger had been paralyzed since the accident. There was considerable contraction of the fingers and the wrist was maintained in a flexed position.

A free incision was made and the tendons dissected from the ulnar nerve, some granulation and cicatricial tissue which had formed between the nerve ends being removed. The distal and proximal ends of the nerve were located, the latter being found adherent to one of the tendon sheaths. Whether it was sutured to the tendon during the original operation he did not know. The nerve ends were dissected free for some distance to secure healthy tissue, and end-to-end suture then performed with No. 1 plain catgut. A flap of fat was obtained from the abdomen with which the anastomotic area was enveloped to prevent future adhesion to the tendon sheath which had been liberated. The next day some motion was noted in the first two fingers, sensation not appearing until three weeks later. This is contrary to the rule in such cases. The operation was performed six months ago, and both sensation and motion are now perfectly restored.

The after-treatment consisted in the application of heat, light massage and passive motion after the wound had healed, followed by gradually increasing active movement to stretch the flexor tendons and develop the atrophied muscles.

A NEW TREATMENT FOR COMPOUND FRACTURE OF THE LONG BONES.

MILLER (*New York Medical Journal*, Dec. 14, 1918) thus describes his method:

For the arm one or two splints may be made—usually two: anterior, posterior, or bilateral. These are easily applied and as easily removed after the plaster has hardened, and the arm or forearm is never out of immobilization. If the patient has but one wound, one of the splints may be bandaged on permanently, and the other removed at will. If there are wounds on opposite sides, first one splint may be removed, wound dressed, splint reapplied and held, while the other is being removed and wound dressed. This prevents absolutely the moving of the injured part actively or passively. For the lower limb, two splints are also made. One posterior splint turns up at the heel, and is molded into the shape of the foot; the second splint is bilateral and goes round the foot like a stirrup up either side of the limb, internally and externally. The latter splint, when dry and hard, slides off quite easily, and the entire limb can be dressed on three sides, the posterior splint keeping the limb in position.

If the wound is in the calf the lateral splint can be made the permanent one, and the posterior splint the removable one; or, if necessary, the splints can be removed in turn, and likewise reapplied. The splints for the lower limb have been of the greatest value, as the ordinary splints have sometimes been very trying to the patient as well as to the surgeon. It has often been difficult to make them fit accurately, and give the proper support at all desired points, without great discomfort to the patient. They have often to be padded, and this padding occasionally gives way, causing pressure sores, no matter how much attention is given to its careful adjustment.

In many cases of multiple wounds, one of which being a compound fracture of the bones of the lower limbs, it is most difficult, if not impossible, to dress all the wounds without turning the patient on his side. This cannot be done in the ordinary way by putting up compound fractures of bones of the lower limb. All these objections are eliminated by the molded plaster splints. The patient can be turned about in any manner without pain or disturbance to the injured limb.

The method of procedure is as follows: The wound in the limb is dressed, and the entire limb is bandaged with one thickness of flannel bandage. The limb is measured for the desired length of the splint; then a piece of flannel or muslin bandage the required length is moistened and stretched out on a smooth, long table. The plaster bandages are soaked in warm water. The adding of salt makes the plaster harden more rapidly. Now starting at one end of the piece of flannel, the plaster bandages are laid down on this flannel (or muslin) from left to right, and back from right to left, until the entire bandage has been used; and another is now used, if necessary, until the desired thickness is obtained. The plaster splint is now made; it is soft and pliable, and is put on the limb lengthwise, the limb being held in position. The splint is bandaged onto the limb by means of gauze bandage, being molded at the same time. The second splint is now made and applied in the same manner. The limb is held in position by means of sand-bags until the splints are dry, usually about fifteen minutes. The making of both splints and their application takes rarely longer than ten minutes. It is only a question of unrolling a moist plaster bandage, folding it in layers, and bandaging it on to a limb. Three-inch bandages are most useful. For forearm, three such bandages are usually sufficient for both splints, made long enough to immobilize the elbow, and going down well on to the hand. About seven are

necessary for the splints in cases of fracture of the tibia and fibula, immobilizing both knee and ankle.

SPLENECTOMY FOLLOWING RADIUM TREATMENT FOR MYELOCYTIC LEUKEMIA.

GIFFIN (*Medical Record*, Dec. 14, 1918) calls attention to the remarkable remissions in the course of myelocytic leukemia, which can be produced by means of the exposure of radium element, or radium emanations, over the enlarged spleen, and which have been recently discussed by Ordway, Peabody, and the writer. The fact that the improvement following radium exposures occurred as a result of treatment over the spleen only, and not over the long bones or over any other structures, led to the inference that possibly a malfunction of the spleen might have more to do with the general condition of the patient than had been supposed. Moreover, if the spleen could be removed at a time when it was small and freely movable, and when the general condition of the patient was good, the operative mortality would doubtless be much less than it had been formerly. Again, the elimination of the spleen as a mechanical factor would remove one of the most troublesome features of the disease, and add to the patient's comfort. Naturally, in the light of the fatal former experiences, it was with considerable hesitation that splenectomy for myelocytic leukemia was resumed.

Twenty patients with myelocytic leukemia have been splenectomized at the Mayo Clinic. The two patients just discussed did not have preliminary treatment by means of radium. The remaining eighteen patients, however, were treated by means of radium exposures over the spleen prior to splenectomy.

The operation itself has not proved difficult in cases of leukemia when the spleen was only moderately large; there have been few adhesions and but little embarrassment from hemorrhage. Postoperative complications have been absent save in one patient who died with peritonitis. Postoperative transfusion was necessary only once.

The operative mortality for the entire group of twenty cases was one death, or 5 per cent. The operative mortality in the reported cases was 86 per cent. It is clearly demonstrated, therefore, that the operative mortality need not be high with proper preliminary preparation of the patient by medical means. A mortality of 5 per cent is lower than the average for splenectomy in general. Patients in remissions with only moderately large spleens are not serious operative risks, even though they had formerly had various forms of hemorrhage.

Of the remaining nineteen patients who recovered from operation, nine have since died, from two months to one year and three months after operation (leaving out of account the early chronic case in which the patient lived five years and four months, with a total duration of history of nine years and six months). The total duration of history in eight of the nine fatal cases was from nine months to three years and six months. In seven of the eight it was more than two years.

The length of life following splenectomy seems to vary most closely with the total duration of the disease. Eight of the nine patients dying subsequent to operation presented a duration of the disease of over two years, while six of ten living patients presented a total duration of disease of less than two years. Two living patients had a chronic type of the disease, and presented a duration of symptoms of over ten years and over six years respectively. Aside from the chronic cases, then, when splenectomy has been performed there is no reason to infer that the disease runs more than its usual course of two or three years.

Seven patients were operated on early in the disease—that is, less than six months from the time of definite onset; six of these are alive, five are in excellent or very good condition. It is possible, though not likely, that in these early cases the results will be better than in the later ones; four of the six patients have already lived more than

one year. Nothing, however, of a definite nature can be inferred from the fact that six of the seven are alive, inasmuch as the total duration of the disease in all of them is less than two years.

It is worthy of note that in two cases of a chronic type the patients are alive ten months and one year and seven months respectively after splenectomy. The total duration of disease in these two patients has been six years and ten months and ten years and seven months respectively. The spleens were large and fibrous, and the leucocyte counts were not very high. Indeed, splenectomy may prove warranted in the very chronic types of the disease, from the standpoint of the patient's comfort, even though it be ineffectual in the prolongation of life.

The ages ranged from twenty-four to fifty-six years and seemed to make no difference in mortality. In general, patients with the largest spleens at the time of operation have died first. This would probably indicate that these patients represented a more severe type of the disease. The average weight of the spleens of the patients who were first treated by radium, and who have died since splenectomy was performed, was 975.6 grammes. On the other hand, those with the smallest spleens at the time of operation have, in general, lived the longest. The average weight of the spleens of these patients was 722.5 grammes. Of twelve patients who lived one year or more after splenectomy, the average weight of the spleen at the time of operation was 800 grammes; in nine patients who had had a very thorough course of radium treatment it was 498.3 grammes.

A period of improvement in the patient's general condition followed operation in all cases save three. This general improvement consisted of a feeling of well-being, which may have been psychic, of an improvement in the appetite and the anemia, of a gain in weight, and a definite loss of the icteroid tint when it was present. The general condition in most instances was quite satisfactory before operation, so that one cannot say definitely that splenectomy was the factor responsible for immediate improvement. Marked gain in weight was, however, almost a constant postoperative feature. The period of improvement was not of definite duration.

The blood, after splenectomy, showed no definite alteration, with the exception of an increase in the relative percentages of both small and large "lymphocytes." This was apparently not secondary to the fluctuation of the leucocyte count itself. Its significance is undecided and the characteristics of these mononuclear cells require further study. It is to be learned whether they are of bone-marrow origin or whether splenectomy in reality stimulates the activity of lymphopoietic structures. In some instances there is a very marked decrease, temporarily, in the number of myelocytes found after splenectomy.

THE TREATMENT OF SYPHILIS IN THE ARMY.

Concerning the treatment of syphilis at Camp Travis in Texas, GUY (*Journal of Cutaneous Diseases,* September, 1918) observes that more than 9 per cent of the cases of syphilis were brought into the army through the draft. Prophylaxis is regarded as a preventive in 90 per cent of the cases. He has a report of about 10,000 prophylactic treatments up to date. During the period of seven months there was a record of 105 cases of venereal disease acquired after service was entered, of which 57 did not have prophylactic treatment.

The routine treatment consisted of rather intensive courses of arsphenamine or its equivalent, with mercury, the two drugs being used in conjunction. An arsphenamine injection and mercury were given each week for ten weeks, after which there was a complete cessation of treatment for five weeks. After this there was a repetition of the physical examination and of the Wassermann test, and another course of treatment was begun, and so on until the Wassermann reaction became negative and re-

mained so. The writer, while not asserting that any of the secondary cases are cured, feels that it is probable that most of the primary cases have been cured. The arsenobenzol brand of arsphenamine has been the arsenical preparation used, and patients with infectious lesions were treated in the hospital. Tobacco was forbidden, and oral cleanliness required. Calomel ointment with massage was applied to local lesions once a day, followed by powdered calomel. When the patients become non-infectious, they are returned to duty, their syphilitic register being forwarded at the same time. When returned to duty the treatment is continued; the mercury is given at the regimental infirmary and the arsphenamine at the base hospital weekly, where the patients are sent at 9 A.M. on certain fixed days. Also the salicylate of mercury is given intramuscularly as a part of the routine treatment both in the hospital and after the return to duty.

The technique that has been adopted is used by all the regimental surgeons, and the injections are given in the evening to avoid loss of time. At first ½ to ¾ of a grain is injected, and this dose is increased at the rate of ¼ grain weekly until 2 or 2½ grains are given at each dose, provided that there are no contraindications. More intensive treatment is employed in cases in which the diagnosis is made by the dark-field method, because we may then reasonably expect a speedy cure provided the individual is strong enough to stand energetic treatment. It is agreed that this treatment should be as intensive as is consistent with safety.

As to the results, while it is too soon to publish conclusions, a positive Wassermann reaction has never been obtained in any of these cases. The routine treatment in primary cases is to give 0.1 gm. of arsphenamine for each 30 pounds of body weight, repeated twice the first week, followed by the usual weekly arsphenamine and mercury for ten weeks; then a rest of five weeks, after which a Wassermann test is made and the course repeated. After this the case is kept under observation, and Wassermann tests made at intervals. In so-called tertiary and certain late secondary lesions, the iodide of potash to saturation is given with the routine treatment. About 400 cases of syphilis have been treated, and about 350 injections of arsphenamine and the same number of treatments with mercury are given weekly.

ANGIONEUROTIC EDEMA.

BOWEN (*Boston Medical and Surgical Journal*, Dec. 12, 1918) gives a résumé of dermatological subjects, under which is angioneurotic edema. He has followed the history of one family, from the first to the fifth generation, definite histories having been obtained of sixty-four individuals. Among them there have been twenty-eight cases of angioneurotic edema, and fifteen deaths from an acute form of the disease. That is, of the 63 known descendants of the first one affected, 27, or 42.9 per cent, have inherited the disease, and 51.5 of those who have had the disease have died of it. The division has been about equal between males and females.

The cases reported by Crowder and Crowder occurred in a family in which the frequent occurrence of local swellings in various parts of the body is a fact of common knowledge to their friends and neighbors, and a matter of concern to the parents of children who may be affected. Many members have suffered severely through longer or shorter lives, and not a few have finally died from attacks in vital organs.

The disease is characterized by acute massive swellings of the skin, and sometimes of the mucous membranes or of internal organs, which develop and disappear with great rapidity, leaving no trace behind them. It has a marked tendency to recur, and is often associated with other neuroses, and it seems to be more or less related to urticaria and other skin lesions exhibiting local vascular disturbances. It is usually acute and sporadic, but a familial type has been observed in which it seems to be distinctly hereditary and has appeared in several or many members of a family through

two or more successive generations. The existence of hereditary angioneurotic edema in this country was first pointed out by Osler. He published the history of a family in which it was present through five generations, and in which 22 members had suffered from repeated attacks of the disease. Later it appeared in two members of the sixth generation.

THE SURGICAL TREATMENT OF PROGRESSIVE ULNAR PARALYSIS.

ADSON (*Minnesota Medicine,* December, 1918) states that progressive ulnar paralysis is a clinical condition which has long been recognized but has rarely been treated surgically. It has been diagnosed as a progressive muscular atrophy and as a form of muscular distrophy. A number of patients have been examined in the Mayo Clinic who have had a single progressive ulnar paralysis and no other form of paralysis or atrophy. The operative findings in these cases verified the clinical condition and presented a marked interstitial neuritis with a diffuse thickening of the nerve as well as nodular masses like neuromas.

The patients who have been under observation in the Mayo Clinic present similar symptomatology: First, the complaint of various forms of slow, progressive sensory changes, such as paresthesias and anesthesias—that is, tingling hypersensitive areas of the skin, and numbness along the course of the ulnar nerve. Second, trophic disturbances, atrophy of the small muscles of the hands, of the flexor carpi ulnaris, and of part of the flexor profundus digitorum which are supplied by the ulnar nerve; the atrophy of the hand is most prominent in the hypothenar region, and there is marked depression between the base of the thumb and the second metacarpal bone. Third, a progressive motor paralysis, first noticed as a definite weakness, and then a gradual loss of motor control of the muscles involved. This phase also presents a peculiar contracted condition of the two outer fingers.

Recently the author operated on the ulnar nerve in three cases in which there were very definite pathologic findings. The nerve was found to be very much enlarged and to present one or more so-called "neuromas" (intraneural fibrous tissue). The enlargement was of the fusiform type with definite thickening and hardening of the nerve itself, and the neuromas were quite definitely circumscribed, though more or less diffuse throughout the nerve tissue. The ulnar groove between the internal condyle and olecranon was found to be very shallow, owing, in two cases which were end results of old fractures, to an overgrowth of bone from the olecranon. In one instance a very definite bony spur of the ulna was present, without a history of fracture. It appears that the diffuse thickening of the nerve is due to frequent or constant but very slight trauma, such as bruising, or to the stretching of the nerve over some of the bony prominences. Small hemorrhages in the perineurium and in the endoneurium result, causing inflammatory reactions and the deposit of scar tissue. As the scar tissue tends to contract, many of the fibers become strangulated and eventually are destroyed, resulting in a gradual and progressive atrophy of the ulnar nerve.

Because of a tendency to overgrowth of callus which results in a condition similar to that for which the patient seeks relief, the author has chosen as a surgical procedure the transference of the nerve to a position anterior to the internal condyle in preference to removing bony prominences or creating a new bony groove as has been done by several other surgeons.

The nerve is freed for a distance of about three inches above the internal condyle as well as for three inches below it, and is then raised from its old ulnar groove to a position internal to the condyle. The tendons and a few of the muscle fibers of the inner head of the flexor carpi ulnaris as well as a few of the tendinous fibers of the common flexor tendon are divided in order to bury the nerve underneath the tendinous fibers, rather than to leave it exposed on the surface of the internal head of the flexor carpi

ulnaris, which would tend to expose it to slight trauma. The nerve is held up in place by a fascial tube, somewhat similar to that employed by Lewis in his nerve anastomoses, the fascia lata being taken from the thigh. This is sutured to the bicipital fascia and to the deep fascias covering the brachialis anticus and the common flexor tendon. The nerve is not attached to the fascia, but is permitted to lie loosely within this hammock, which prevents it from slipping down over the condyle as the arm is extended.

The treatment of the thickening or of the neuroma depends largely on the amount of paralysis present. If, judging from the neurologic findings, the patient has complete or three-fourths paralysis of the ulnar nerve, complete resection of the diseased portion of the nerve with anastomosis of the severed ends is advised; but if the paralysis is less than half, instead of resection he advises the longitudinal splitting of the epineurium and perineurium in several places about the nerve in order to liberate the columns of nerve fibers from the contracting scars. If it becomes necessary to resect and anastomose the nerve, it is comparatively easy to bring about a direct apposition of the severed ends, and then to anastomose by the use of interrupted silk sutures in its sheaths. After the nerve has been transferred to its new position, the flexor tendon as well as tendinous fibers from the common flexor tendon are sutured back to their normal position, thus making a new groove for the entrance of the ulnar nerve, which passes underneath the inner head of the flexor carpi ulnaris to its normal position between the two heads and under the flexor carpi ulnaris. The wound is closed without drainage.

It is advisable to use massage postoperatively. Electricity has probably little value. The nerve in its new position causes very little trouble, and the results are most gratifying in that the progressive paralysis ceases, or improves to an appreciable degree, particularly if the nerve has not been injured too severely.

DUODENAL FISTULA.

Pannett holds that recovery from a duodenal fistula, even with adequate surgical treatment, is a rarity, and observes that only three cases are to be found in the writings for the last ten years. This is quoted by EINHORN (*Medical Record,* Nov. 30, 1918) as an introduction to the narration of a case in which duodenal feeding proved highly successful. Mayo has written perhaps the most constructive paper on duodenal fistula that has yet appeared.

Palmer thus defines the symptoms of duodenal fistula: Inanition is such as will occur following a fistula in no other part of the intestinal tract, and is comparable in effect to a break in a mill-race above the water-wheel—no power is obtained.

Dehydration rapidly follows unless energetically combated by rectal or subcutaneous injections. This dehydration follows the loss of a large output of fluid in the form of bile (1 liter), pancreatic fluid (0.5 liter), etc., and also the interference with the fluid absorption.

A marked specific toxic action may follow the systemic absorption of the normal or changed secretions from the uncovered fistulous tract.

The digestive action of the normal secretions has full sway on the duodenal fistula and the tract leading to the surface, to such an extent that the hole shows a progressing enlargement, in contradistinction to the behavior of most other intestinal fistulas. Digestion of the skin of the abdomen and back is so rapid and unrelenting as to make the life of the patient a hardship to himself because of discomfort and pain, and to the nursing force because of the frequency of the needed dressings.

The secretions to be controlled are so varied as to render the problem more difficult than appears at first sight. These are the secretions of the stomach, the liver, the pancreas, and the duodenum itself.

Bleeding from the raw surface of the tract may assume alarming proportions.

Fat necrosis is sometimes observed in these cases.

Extension of the peritoneal inflammation may occur, owing to the digestion of adhesions.

The amount of discharge is out of all proportion to the size of the aperture; this may be due to the sphincteric action of the circular muscle fibers at this location.

The expectant treatment, according to Palmer, has the following objects in view: (1) Protection of the skin and the tract itself against the digestive action of the secretions; (2) introduction of fluids and nourishment in quantities sufficient to maintain not only life but also the reparative power of the tissue; (3) reduction in the amount of gastric and intestinal secretions; (4) neutralization and dilution of these secretions.

The use of a low-melting-point paraffin applied hot to the dry skin is good. For the tract itself the injection of liquid petrolatum and zinc oxide ointment to the bottom of the tract is not only painless, but is apparently of benefit; and liquid petrolatum, because an inert mineral oil, should be given by mouth in large doses, so that it may in part coat the fistulous tract from within out.

Glucose (10 per cent) by rectum, with plenty of sodium bicarbonate. Later, when food is given by mouth, it must be such as will produce the least secretory stimulation

Milk, fats, oils are then permitted, while beef extracts are forbidden. Alkalies, atropine, and epinephrin are recommendable. In short, the principle consists in keeping the stomach and duodenum as empty as possible, while the organism should receive as much nutritive material and fluids as conditions permit. In the medical plan of treatment the main avenue of nutrition and fluid instillation is the rectum. In the surgical régime the jejunum is utilized for nutrition, either by a jejunostomy (Pannett) or by a gastrojejunostomy and pyloric occlusion (Berg). The pyloric occlusion serves to divert the chyme from entering the duodenum and irritating the fistulous opening.

The duodenal tube, when made to reach the jejunum, can accomplish all that the suggested operations do without the necessity of cutting. It furnishes at once a perfect canal for the introduction of nutritive material and fluids into the jejunum and it also prevents the entrance of chyme into the affected duodenum. The stomach being kept without food, there is usually no gastric juice. If there should be gastric secretion anyway, additional medication with atropine will accomplish its cessation.

The plan of treatment will, therefore, consist in introducing the duodenal tube (a long one) into the jejunum, and as soon as the tube has reached this place to commence feeding according to the rules of duodenal alimentation.

Duodenal alimentation was first used in a perforated gastric ulcer by Dr. N. de Rosas, with perfect recovery.

A similar plan of treatment was successfully carried out by Dr. Willy Meyer and Einhorn in a case of perforation of the duodenum. They are both confident that this measure saved the life of the patient, for she was not in condition to have stood the risks of any additional operation.

In this patient, perforation of the duodenum had taken place some time after a laparotomy. Patient was then so weak that operative intervention could not have been thought of; nor would any expectant plan of treatment have been of any material assistance. The rectum would not have sufficed to keep the patient alive for the long period required for the healing of the fistula. Jejunal alimentation at once removed all the obstacles and smoothed the way toward recovery.

There seems to be no doubt that the jejunum alimentation is the ideal plan of treatment for perforation of the duodenum whenever the fistulous opening leads to an external wound. In the first group of perforation (usually doudenal ulcer) an operation is always demanded, and suture of the duodenum after infolding is frequently done. If the tissue is brittle, and there is danger of bursting, Berg recommends, as mentioned above, an additional operation of gastrojejunostomy and pyloric occlusion.

Einhorn suggests, instead of adding this operation, to use jejunal alimentation right after the laparotomy. This would surely do as much good as the operation of gastrojejunostomy. It has the great advantage of not being connected with any risks and of establishing adequate nutrition right from the start. Another advantage is that by this régime the physiological relations of the viscera remain undisturbed, while a gastrojejunostomy, especially with pyloric occlusion, creates new conditions to which the organism must gradually adapt itself, sometimes with difficulty.

This suggestion does not apply to operations which produce a considerable narrowing of the lumen of the duodenum; here a gastrojejunostomy with pyloric occlusion is a necessity which cannot be obviated.

GONORRHEA IN WOMEN.

COURTRIGHT (*Northwest Medicine*, November, 1918) observes that during an acute attack there is not much difficulty in finding the gonococci. Later, however, during the chronic state this is far from being the case. At this time they are found only after thorough search under favorable conditions, and then in smears made from secretions or exudate from vulvovaginal glands, urethra, cervix, Skene's glands or other small glands presenting a small gonorrheal macule.

His routine method is to clean the surface over the mouth of the duct of Bartholin's gland, compress the gland, take a smear of pus or secretion that oozes from the duct, trying to avoid as much contamination as possible from the surrounding surface. In case of the urethra, insert the forefinger into the vagina, compress the urethra against the symphysis, withdraw the finger, using firm pressure against the urethra. This usually gives good specimens. For a specimen from the cervix swab out and free from tenacious mucus. Then compress the cervix, or use a dull curette. Take the specimen with small swab or syringe. It is sometimes best to take a specimen from Bartholin's glands with a hypodermic needle and syringe.

If all these specimens are free from pus cells, we are not apt to find the diplococcus of Neisser present. The finding of pus cells indicates taking the specimens following the menstrual period or after use of some mechanical or chemical irritant, followed in about forty-eight hours with more specimens. It is a good policy, where pus cells are found from the urethra or Bartholin's glands and no gonococci are present, not to tell the patient she is free from gonorrheal infection, but say the specimen does not show germs that cause the disease and to be positive will require examination of many specimens.

As to treatment of gonorrhea with its various complications, this would require volumes. Therefore, in a brief way, the author mentions some essentials in treatment of subacute and chronic gonorrhea, as these are the cases that are so common.

In the majority of these patients we will find one or both vulvovaginal glands involved. The chief clinical manifestation is a small reddish macule at the orifice of the duct. The gland may present an apparently normal secretion. This type of gland can be best treated by injecting it with one of the silver salts. Use a blunt needle to inject the glands, filling it until the patient senses a little pain. This should be done at least every other day. When one of these glands becomes cystic or an abscess forms, the remedy is an excision of the gland, an operation that is not always as simple as it may seem. A mere incision only gives relief but does not cure.

The urethra is one of the permanent homes for the gonococcus in the female, which lodges in the small glands along the floor of the urethra, especially just within the external urinary meatus where are two large gland openings. These are Skene's ducts, which are from 5 to 15 mm. in length. They extend upward along the urethra and end in a cul-de-sac.

These glands are of interest, as the gonococci frequently lie latent in them for pro-

longed periods, and may at any time set up an acute condition. In chronic cases Skene's glands come in for their share of attack. In treating the urethra, therefore, we must attack these glands by injecting them as in the case of Bartholin's glands. These should always be injected before the urethra is given its general treatment. If they do not clear up on use of silver salts, cauterize them.

Granulomata around the orifices of these ducts form the pseudo-abscess of Jadassahn. The only successful therapeutic measure in these cases is to split open the duct, thoroughly cauterize and completely destroy the glands or their remnants.

One encounters occasionally small tumors that resemble caruncles. They are usually located close to the meatus. By using the hairpin speculum or elastic wire dilator they are curetted off, and their linear base cauterized with the electric cautery.

The cervix is one of the most difficult locations to cure of a gonorrheal infection. On account of the depth of the cervical glands the ordinary antiseptics do not come in contact with or even approach the deep periglandular involvement. It is necessary first to clean away mucus. This is best done by using a solution of soda bicarbonate and cleaning out the cervix as far as the internal os. One favorite treatment is tincture of iodine applied daily to the cervical canal. Where it is used this often, one must protect the vaginal cervix from contact with the iodine by using cotton or gauze. The author usually smears the vault of the vagina with petrolatum.

Since the habitat of the gonococcus is deep in the cervical glands and their walls, it is reasonable to believe that they are not reached by ordinary chemical means. Thermotherapy is of great value in these cases to bring about a speedy cure, where there is no infection beyond the internal os. Heated sounds at a temperature of 125° F. for one to three hours are efficacious.

The use of prolonged hot douches at home, if properly carried out, gives excellent results in endocervicitis, as well as in conservative treatment of tubal involvement. The author's plan is to have the patient take these douches lying down, continuing their use for thirty minutes to one hour at a temperature of 115°. Some can combine hot hip bath with the douche, which gives excellent results.

The Schroeder operation should be done on the cervix, when the tubes are removed, as the case is still infective in the cervix. The usual general line of treatment is to remove the tubes, with directions to take lysol douches.

THE VALUE OF THE DICHLORAMINE-T SOLUTION IN THE TREATMENT OF INFECTIONS OF THE UPPER AIR-PASSAGES.

DELAVAN (*American Journal of Surgery*, December, 1918) states that explaining the action of dichloramine-T in oil, Dr. Dakin says that antiseptics incorporated with or dissolved in oily substances usually possess little if any antiseptic activity because intimate contact with the infected matter is hindered by the oil. When, however, the dichloramine-T solution in chlorcosane is brought in contact with aqueous media the partition coefficient between the oil and the water is such that a certain amount of the dichloramine-T passes into the water and there exerts its germicidal action. The amount of the dichloramine-T thus passing from the oil is increased by the presence in the aqueous medium of substances capable of taking up chlorine. So that the oil solution seems as a store for the antiseptic which is drawn upon to maintain the germicidal activity of the aqueous medium with which it is in contact. The dichloramine-T oil solution may be sprayed upon wound surfaces or poured into accessible parts of deep wounds. It yields moderate amounts of the antiseptic to watery media, such as secretions from wounds or mucous membranes. It is suitable for sores requiring prolonged antiseptic treatment and for first dressings of wounds which do not require irrigation. The application of the oil is ex-

tremely simple, and generally it need not be renewed more than once in twenty-four hours.

Admitting the germicidal power of dichloramine-T, it is desirable to study its value in the disinfection of septic conditions of the upper air-passages, regions especially liable to infection, prone to harbor germs of dangerous character, abounding in recesses difficult of access by the ordinary means of application, and often becoming foci of infection threatening extreme danger. This is especially true of the upper nasal region, the vault of the pharynx, and the tonsils. The dichloramine-T may be used to advantage in these regions under three different conditions: To prevent the extension of newly acquired infection; to overcome the acute results of infections; and to abolish the bacilli persisting in carriers.

The success of the method must depend upon the thoroughness of the application of the disinfectant. Brushing the surface of the tonsil or spraying the lower section of the nasal cavity cannot possibly be effective. A spray atomizer must be used which will carry the spray in all directions—upward, downward, and sidewise.

The crypts of the tonsil must be disinfected to their lowest depths, and the superior half of the nasal cavities must be thoroughly reached. To effect this the following principle must be recognized and carried out: The parts must first be cleansed, and then exposed to the fullest extent by the application of adrenalin or some similar astringent, and finally the dichloramine-T oil sprayed into them until every crypt and recess has been completely reached. This thoroughness is absolutely necessary in order to secure the removal of the most deeply seated germs.

Used in the strength of two per cent or less, the solution with chlorcosane is not irritating, although stronger solutions may be. Suitable atomizers are necessary. The success of this method has thus far been gratifying.

Where this method fails, in the presence of hypertrophied tonsils or adenoids, the removal of the latter may be necessary to effect a final cure.

The desire of the author is to furnish a method so simple in itself as to be readily carried out by the average practitioner, with the aid of apparatus inexpensive, durable, clean, compact of form, light of weight, and therefore available for use under all circumstances of medical practice whether civil or military.

The essentials to success are: Recognition of the principle of the necessity for the complete exposure of the centers of infection; the use of a proper spray atomizer; the devotion of sufficient time and care to the effective carrying out of the treatment.

THE CURSE OF IMMOBILIZATION.

Dowden (*British Medical Journal*, Nov. 23, 1918) states that thousands of our soldiers have been more or less disabled for life simply and solely on account of prolonged immobilization of injured limbs.

If asked as to the lessons learnt during those four years, Dowden would emphatically say, first, that nature is the most wonderful surgeon, especially when encouraged; secondly, that septic wounds should be thoroughly drained; thirdly, that from the very beginning frequent passive and active movements should be carried out, steadily increasing the range; that splints should never be used except when absolutely necessary, and then only for as short a time as possible, and should never interfere with passive and active movements.

In war surgery the future usefulness of the wounded must be borne in mind, and in that relation the order of importance is—muscles, joints, and bones; not bones, joints, muscles. If a demand is made upon nature without undue pain, and carefully advancing, nature will always respond. Disuse, active and passive, means malnutrition of the part. Muscles atrophy, bones atrophy, blood-vessels atrophy, pus tends to track along the intermuscular planes; passive and active movements help to drive the pus out.

When passive or active movements are begun early, pain is the danger-signal that

shows harm is being done, and the movements should be modified temporarily. When after prolonged immobilization adhesions have formed, however, pain has to be endured while the adhesions are being stretched or broken.

Take, for example, the case of a man shot through the biceps. His forearm was placed at a right angle and kept in that position for weeks; he was then unable to extend the arm, and after many long weeks of massage recovery was incomplete. In the case of wounds through the forearm where the bones and nerves have escaped, and treated with splints for prolonged periods, it is found that when movements of a passive and active nature are attempted the patient is unable to carry them out owing to the formation of fibrous tissue during the period of immobilization. The most marked results from muscles involved are found in the hamstring muscles and the calf. How familiar is the sight of convalescent soldiers limping about the streets with bent knees and on their toes! The majority of these will never straighten their legs again or dorsiflex the foot in walking, owing entirely to neglect of the muscles and joints, and constant straightening and correcting by active and passive movements. Injuries to joints, even though septic, are not a bar to movement; the joints should be gently moved and encouraged, short of pain, and it is wonderful what results will ultimately be obtained provided attention is paid daily to movement (passive at first and later active and steadily increased).

As to pain, the attitude of most present-day surgeons, Dowden says, is wrong. For the last twelve years he has treated all fractures of the scapula, clavicle, humerus, and many of the forearm, without splints. The main point is that every movement of all joints and muscles should be encouraged, first of all passively and as soon as possible actively, and this should be carried out frequently during the day. It is surprising to see a patient with a fractured humerus, with possibly overlapping, extending the arm, flexing it and lifting it from the side, in the course of a fortnight or three weeks; by the time the fracture has consolidated, all the movements of the joints are perfect, provided the damage has not been too great. In simple fractures the results are admirable.

PREVALENCE OF SYPHILIS IN THE UNITED STATES.

An article by HIBBS (*Journal of Sociologic Medicine*) has been summarized by the *Urologic and Cutaneous Review* (January, 1919) to the effect that a consideration of the prevalence of syphilis in the United States shows that in 1915, 5819 deaths were reported as due to syphilis in the registration area of the United States. This was a ratio of 8.6 deaths per 100,000. But these figures are, however, for deaths reported as due to syphilis. They do not represent the deaths actually resulting from the disease, for it is a well-known fact that in syphilitic cases physicians do not state the true cause in filling out the death certificates. In order to correct this error, many statisticians have added to the deaths reported as due to syphilis, others reported as due to general paresis, tabes, apoplexy, arteriosclerosis in young persons, and other causes recognized by the medical fraternity as the result of or sequelæ of syphilis. The chief objection to the method is that no one knows accurately what proportion of deaths is actually due to syphilis. We may be fairly certain that practically all deaths reported under general paralysis result from syphilis, but it is extremely doubtful whether such diseases as congenital debility, icterus, and scleroma would by all medical men be ascribed to syphilis.

In estimating the prevalence of syphilis from morbidity statistics two methods of diagnosis must be distinguished. The first is by what is known as clinical methods, in which the chief reliance is placed on scars, history, and symptomatology. The second is by the estimation of specimens of blood or spinal fluid, more commonly by the Wassermann blood test. The two methods give differing results.

In certain States physicians are required by law to report all cases of venereal disease occurring in their practice. Unfor-

tunately, however, the law is not enforced, and hence statistics based on such reports are of little value.

When statistics are not available for entire communities (complete enumeration) the statistician turns to statistics for representative groups. The results of such representative inquiries afford the chief source of data as to the prevalence of syphilis in American communities. The most fruitful source of data of this kind is the result of medical examination of employees, applicants for licenses, army recruits, etc. Similar statistics showing the proportion of syphilis found among patients treated in dispensaries or admitted to wards of hospitals are also available. But such figures are of less value because it is not clear of what class of the population hospital and dispensary patients are representatives.

An estimate made of the United States Marine Hospital Service showed: All cases, 53,344; venereal disease, 11,414; gonorrhea, 6974; syphilis, 4440.

Since the discovery of the Wassermann blood test the failure of clinical methods to afford an accurate means of diagnosis for syphilis has become universally recognized. From two and one-half to five times as many cases of syphilis were discovered by means of the Wassermann test as by the use of the clinical method of scars, histories, or symptoms. Consequently, it may be asked: What value have clinical statistics as a basis of estimates of the prevalence of syphilis? At first sight it may appear that such statistics have little value, but further consideration will show that they have their usefulness. Any investigation based on clinical methods of diagnosis, in which it is assumed that this method could be depended on to reveal the disease in practically all cases in which it existed, would be fallacious. But an investigation of this kind, not based on such an assumption, but based on the knowledge that the results of the use of the clinical method will be two and one-half to five times below the actual facts, will have considerable value. In order to get the true approximate per cent of syphilis, therefore, it will be necessary to multiply the figures obtained by the clinical methods of diagnosis by from two and one-half to five times.

There are two methods of administering Wassermann tests in investigations of the prevalence of syphilis. The test may be made only in cases in which syphilis is suspected, or it may be made in every case, regardless of whether the disease is suspected or not. The latter method is the only one which results in statistics of value as the basis of an estimate of the amount of syphilis in the group of people examined.

It is difficult to summarize the statistics quoted in the article, except roughly as follows: About 5 per cent among students; 8 to 11 per cent among white workers; 15 to 20 per cent among the lower classes of whites and among negroes. No absolutely definite conclusion can be drawn because there is not enough evidence available.

The author suggests a method for future investigation. In the studies of the problem made by individual physicians and statisticians it will be noted that all are restricted to a particular group class or area. Obviously the result of no one such restricted study can afford an accurate index of the prevalence of the disease in the country as a whole. Taken alone, the results of such inquiry are limited strictly to the particular area or group studied. But when the results of a great number of these restricted inquiries are combined and compared, conclusions of wider and more general significance may be obtained. This, in the writer's opinion, is the most feasible method of estimating the prevalence of syphilis in the country.

CARBOLIC ACID IN TETANUS.

Perhaps no treatment has ever been more thoroughly discredited by a wide experience showing its entire futility than that of treating tetanus by carbolic acid, which makes interesting DELFINO'S contribution (*New York Medical Journal*, Nov. 23, 1918) to the effect that in a patient who had already received 20,000 units of antitoxin he made a further injection of 35 Cc. of a 2-per-cent phenol in sterile oil. The following dermatitis, which involved the whole face, he attributes to the phenol, as

also scanty, cloudy urine. He, moreover, goes on to state that as phenol was manifestly the cause of the young man's recovery, we should give it to other poor victims of the dread disease, in the hope that it will prove equally efficacious.

The perusal of his case, which is scantily reported, does not afford the faintest scintilla of evidence that the phenol was other than harmful. Autohypnotism has at times a pernicious influence on medical practice.

THE ADMINISTRATION OF NOVARSENOBENZOL PER RECTUM.

GRAJEWSKI (*Urologic and Cutaneous Review,* January, 1919) regards this as the simplest method of administering arsenic for the care of syphilis. It is a comparatively easy mode of administration, and it is to be hoped that all practitioners will soon learn to recognize its innocuousness and the ease with which it can be carried out. At present, however, there are many who systematically refuse to employ this method. There are, on the other hand, patients who cannot be induced to have an intravenous injection, so that we are fain to devise a method of administration that does not clash with the patient's prejudices, and the administration of the drug per rectum appears best to fulfil these conditions.

The first attempt with arsenobenzol was made by Geley of Anneacy and Luis de Portillo, while the rectal injection of arsphenamine was made by Azemar, with a report of thirty-six cases.

Hajat calls attention to the immense advantage of the rectal administration, viz., the absence of any prostration, pain, or discomfort, and the mildness of the rare signs that follow its introduction. He shows at the same time that the results obtained are exactly those that might be hoped for from intravenous injections, adducing in support of his statement observations made upon one hundred and twenty-five cases. The description of the details of his method does not differ in any essential particular from that of other observers.

Inasmuch as doubt has been expressed with reference to the action of the drug administered by this path on the ground that arsenobenzol would precipitate in the intestine, forming an insoluble albuminous compound, the results that have been placed on record show that this must be a mistake or an error of appreciation. In any case the criticism does not and cannot apply to novarsenobenzol, which remains perfectly soluble in the intestine. As, moreover, its solutions as seen are particularly easy to make, we can employ it with every confidence and assurance.

The essentials of the technique are as follows: Night before patient receives a mild laxative and on the following day is to take one light meal, and the bowels should be evacuated by a copious tepid irrigation at the temperature of the room. Lastly, to take a pill containing one centigramme of extract of opium, the object of which is to keep the bowels quiet so that the solution can be retained.

Thereupon the selected dose of novarsenobenzol is dissolved in fifty grammes of recently distilled and sterilized water. The solution is drawn up into a sterilized glass syringe and injected into the rectal ampulla via a gum elastic or a vulcanite catheter of large caliber. The catheter suitable, anointed with vaselin, is introduced into the rectum to a depth of three or four inches and solution allowed to enter the rectum slowly. The patient should abstain from going to the closet until the following day.

Benoit holds that this mode of administration of novarsenobenzol yields results slightly inferior to the intravenous method. Where the rectal method is clearly superior to the others it should be administered. Properly handled, the rectal administration of novarsenobenzol can be regarded as taking the place in all cases of other procedures, especially intravenous injection. But apart from this it has special indications. For instance, we can have recourse to this procedure whenever for any reason intravenous injection presents a difficulty of some kind, when the veins are not prominent in spite of the application of a constricting band above the elbow, or when they are separated from the skin by a thick layer of adipose tissue, when the veins are

very small, and this mode of administration is especially suited for children.

The dose administered for healthy adults was usually 0.9 grm., for children 0.6 grm., repeated at intervals of six days with six injections, which completed the cure; on the other hand, if still positive the course of treatment was repeated and combined with mercury.

The following conclusion drawn from private practice seems to sum up what is known in respect to the intrarectal administration of novarsenobenzol:

Suppression of constitutional and local consequences that sometimes follow intravenous injection.

The ease with which it can be applied to the young.

The complete absence of untoward consequences.

The rapidity and simplicity of its preparation.

The rapid absorption of the drug from the rectum.

Presence of the drug in ponderable quantities within two hours.

The equivalence of the results obtained.

It is a perfectly safe and easy method which enables one to treat syphilis in a way and with a remedy that is recognized to be indispensable in combating this formidable disease.

STUDY OF EXPERIMENTAL GONOCOCCAL INFECTION IN ANIMALS.

CULVER (*Journal of Urology*, Vol. II, No. 5, 1918) after a summary of the laboratory work recorded in this relation says that from a search of the literature on this subject one is forced to conclude that gonococcal infection in animals, in the sense that the organisms increase within the animals and invade their tissue, does not occur. The slight early increase in the number of organisms is explained apparently by the development on the artificial culture medium injected with the organisms, together with the lowered body temperature immediately following such an inoculation. The many positive reports are due to lesions produced by the injection of gonococcal toxin and not the result of gonococcal infection. The variability of reported results undoubtedly is due to the difference in virulence and toxin production of the various strains of gonococci, as well as to the varied susceptibility of different animals of the same or different species, and to the great change in the immunity of a single animal during the different seasons of the year.

With the exception of Wertheim's experiments all endeavors to produce experimental gonococcal infection in animals were made by the use of organisms grown on ordinary serum media. He grew the organisms on a medium made from homologous serum, thus hoping to utilize the adaptive properties of these microörganisms; however, no attempt was made to increase the concentration of this homologous serum for the bacterial culture.

Danyz found rat serum highly bactericidal for anthrax bacilli, but by growing these organisms successively in rat serum broth tubes he noted that they grew in more and more concentrated serum. These organisms thus immunized presented very different cultural and morphological characteristics. In a similar way he immunized anthrax bacilli to arsenical preparations.

With the above observations in mind Culver decided to grow gonococci under similar conditions previous to similar injection before concluding that the animals were absolutely immune to such infection. A laboratory strain of gonococcus was transferred from human blood agar to freshly made rabbit blood agar, and this culture in turn was transferred in forty-eight hours to a second rabbit blood agar tube of the same blood concentration. Fifteen such transfers were made, and the organisms were then tested to ascertain their resistance to fresh rabbit serum.

It is apparent that gonococci readily develop a fastness for the gonococcidal substances contained in rabbit serum. This adaptive ability is not altogether unlike the tolerance acquired by typhoid bacilli for normal rabbit serum.

The author concludes as follows: Rabbit serum has a marked bactericidal action on gonococcal cultures. The titre varies for

different rabbits, but averages approximately 1-75.

Gonococci readily adapt themselves to such bactericidal substances, and by growing them on gradually increasing strengths of fresh rabbit serum broth gonococci will readily grow on serum broth 1-2.

One strain of gonococci adapted itself to whole rabbit serum, in which it grew readily.

Successive transplantation of gonococci on rabbit blood agar increases the tolerance of these organisms for rabbit serum up to the twenty-sixth transfer. Further transplantation neither increases nor decreases the tolerance already acquired.

This serum fastness of gonococci seems highly persistent since it took 25 successive transplants on human blood agar to cause its complete disappearance.

The serum-fast gonococci remain longer in the blood stream of a rabbit than ordinary strain of gonococci. Positive blood cultures were obtained forty-eight hours after intravenous injection on three occasions, and in one animal five days after injection. Ordinary gonococci do not so behave.

REVIEWS.

A Practical Medical Dictionary. By Thomas Lathrop Stedman, A.M., M.D. Fifth Revised Edition, Illustrated. William Wood & Co., New York, 1918. Price $5.

It is indicative of the high standard of the American medical profession that it proves so good a market for medical dictionaries. Whereas many years ago Dunglison's Dictionary was the only medical dictionary of repute, to-day there are a number which are close competitors for the best place, and two or three between which there seems to be little choice. The present edition of Stedman's medical dictionary covers 1124 pages, but the paper is thin, and so the volume is not as bulky as this number of pages would indicate. The paper also is so good that the register does not show through, and the type is sufficiently large not to disturb the eye. We have used this dictionary as a handbook for ready reference ever since the first edition appeared, and while one of its competitors has also been largely used we have had so much experience with this particular volume that we can highly recommend it to any one who is contemplating purchasing a dictionary which is up to modern methods and terms in every respect. The amount of information which it contains and the quality of the publishers' work lead us to express surprise that so well printed and well bound a volume (the binding being, by the way, flexible) can be put on the market at so low a price.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by Hobart A. Hare, assisted by Leighton F. Appleman. Vol. IV, December, 1918. Lea & Febiger, Philadelphia, 1918.

The December issue of Progressive Medicine contains, as it has done for the last twenty years, articles upon the Digestive Tract and Allied Organs; Diseases of the Kidneys; Genito-Urinary Diseases; Surgery of the Extremities, Shock, Anesthesia, Fractures and Dislocations, etc.; and a Practical Therapeutic Referendum.

The first of these articles is written by Dr. Martin E. Rehfuss, a well-known investigator and contributor to the study of gastrointestinal disorders. The article on the kidneys is by Professor Christian, of Harvard University; Dr. Charles W. Bonney of Jefferson Medical College writes the third article; Dr. Bloodgood of Baltimore writes the fourth; and the last is contributed by Dr. H. R. M. Landis of Philadelphia.

The volume, as in previous years, tells the story of the advances made in these lines during the previous twelve months, and the reputation of the contributors guarantees the value of what they write.

CORRESPONDENCE.

DOUBLE-FACED MONSTROSITY.

To the Editors of the THERAPEUTIC GAZETTE.

SIRS: On June 23 I was called to see Mrs. R. I found her with a temperature of 105°. She told me that she was within eight days of her confinement time, according to her count. The next day her temperature was 103°, at 4 P.M., and everything pointed to typhoid fever. Her tongue was red, she was very nervous, her complexion was dark, and the face pinched. I put her on an emulsion of echinacea, a teaspoonful every three hours. I told the family that I would not call on the 27th unless something more than just the fever condition were to develop.

About 4 o'clock on June 27 I was called

to see her, being told that the patient was having "some pains in her stomach." Upon my arrival I found the woman in labor, and I remained for several hours. The labor-pains were very slow. I informed the family that the baby or babies were dead, and I believed that there were twins. After several hours' waiting, finding dilatation sufficient, I ruptured the amniotic sac. The amount of fluid which escaped was enormous. Then, after some time, I tried to use the forceps. The head was well placed, so I thought there would be no trouble in delivering the child; however, I worked until completely worn out. It was impossible to get a firm hold of the head with the forceps.

Finally I told the family that this was not a one-man job, and called in Dr. F. O. Taylor. When he came he could not do any better than I could. Eventually we decided to perform podalic version. I inserted my hand and arm up to my elbow and grasped one foot, and I had Dr. Taylor manipulate on the outside while I indicated to him how I was coming around with the foot. After securing one foot and leg, I turned the case over to Dr. Taylor, for I was completely exhausted. After many fruitless efforts by both of us, we decided to take a hold of the leg that we had out and pull on it until we could move it. Exerting our utmost strength we finally pulled the body out to the head, and to our surprise the body stopped. We worked with instruments and our hands for some time.

When we got the head to pass, we found what had been the cause of our trouble. There were two complete girl babies, but they had only one head, and this head had two faces. The bodies, from the head down, were as perfect as those of any normal baby. The faces, Janus-like, were turned in opposite directions. I am sending the best photograph that I could secure; while not good, one can see the face of one and the back of the head of the other one. The two babies weighed 14½ pounds. The mother is about twenty-eight years old and weighs about 120 pounds.

Within three days after the birth of the babies, notwithstanding the severity of the ordeal, the mother's temperature went down and she made as fine a recovery as she did in her five previous confinements. In Edgar's work, fifth revised edition, page 417, is a picture of a similar monstrosity, this one, though, differing in that the face is turned.

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